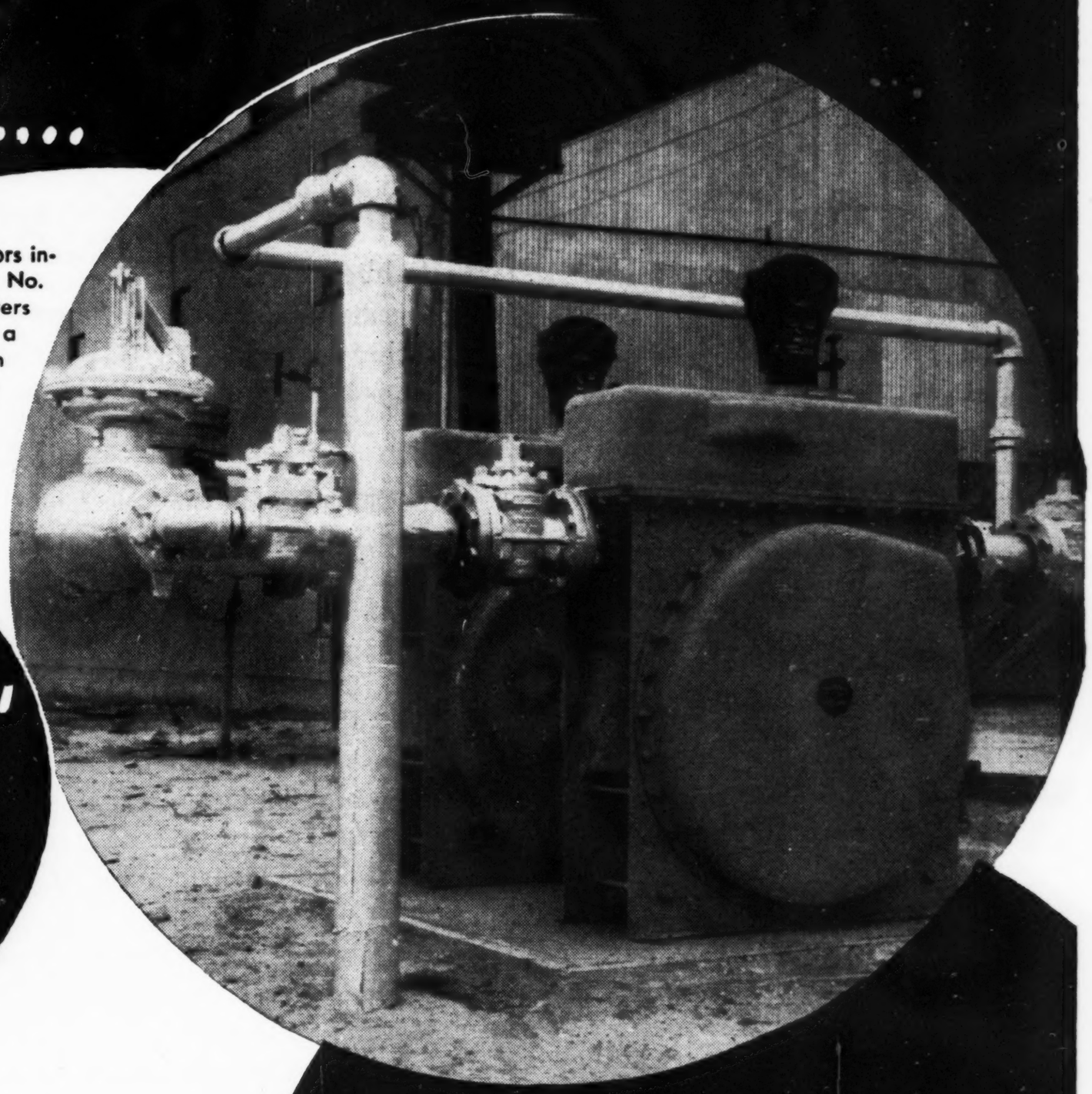
ROCKWELL-EMCO

METERS and REGULATORS.....



Out-of-doors installation of two No. 5 Rockwell-Emco meters with Emcorectors serving a sugar-dehydration plant in Texas. Line pressure is controlled by a Rockwell-Emco high pressure balanced valve regulator and Nordstrom valves.

Built to "Take it"

Inside and Out....

You can rely on Rockwell-Emco meters and regulators to stand up under the toughest operating conditions. Bodies and parts are subjected to rigid test to insure dependable service. The high impact resistance of these units minimizes chance of damage from external causes. Sturdy mechanisms, built around carefully engineered designs, assure long life with minimum attention.

Rockwell-Emco meters and regulators go together like hand in glove. You can make measurement engineered pairings from the most complete selection in the industry.

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ROCKWELL MANUFACTURING COMPANY
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Rockwell-Emco Gas Meters and Regulators for Every Requirement

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GAS

REG. U. S. PATENT OFFICE

A JENKINS PUBLICATION

Twenty-Sixth Year of Publication

February, 1950 CCA NBP **Vol. 26—No. 2**

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Highlights

Floor-under-field-price notion is gaining acceptance. Before the Oklahoma Supreme court had ruled the two-year-old corporation commission price fix legal last month, Texas producers began clamoring for similar price control. The producers' association may broach the idea before the state legislature soon. Meanwhile Cities Service Gas Co., which with Phillips Petroleum originally challenged the Oklahoma order, threatened to carry the case to the U. S. Supreme Court.

Despite rising materials costs, Servel's new line will sell for less than last year. Range manufacturers are reportedly in agreement on this price philosophy, will hold the price line if they can.

Every gas sales executive is going to get briefed this month or next on national sales campaigns for the entire year. Seven regional sales meetings, sponsored by the AGA, are scheduled, with Boston and St. Louis first, on Feb. 20. Then come Pittsburgh, Feb. 21; Houston, Feb. 22; Milwaukee, Feb. 23; New York Feb. 27; Birmingham, March 2.

Northeastern Gas Transmission C. has signed up two more New England customers. Bridgeport (Conn.) Gas Light Co. and Greenwich (Conn.) Gas Co. were the 12th and 13th to ink contracts to take gas from the company. Northeastern proposes to distribute to retailers gas which it would buy from Tennessee Gas and Transcontinental line extensions.

Ambitious pipeline plans were announced last month. Southern Natural Gas Co. filed for a $32.5 million program of expansion to boost daily capacity by 109 MMcf. If they're okayed in time, construction will be started this spring. Panhandle Eastern filed for a $14.5 million plan including 170 miles of loops in Illinois, Indiana, and Michigan. Already approved is Northern Natural Gas Co.'s (Omaha) $52-million job designed to bump capacity on the line north of Kansas by 130 MMcf, bringing the system total to 600 MMcf. Looping of 597 miles of main line is the principal item. Construction must start before May 1.

Southern Natural is encouraged about its coal gasification program at Gorgas, Ala. Chairman C. T. Chenery has been quoted as saying that 1000-Btu "pipeline" gas can be made for 50 cents per Mcf. A pilot plant to carry on tests of the process is on the drawing boards.

A disparity between reserves reports of FPC engineers and New Mexico geologists has resulted in postponement of hearings on El Paso's request to pipe San Juan gas to San Francisco. They'll take up again April 17. A few days later El Paso reportedly bought out gas holdings of Delhi Oil Corp. in Barker Dome in San Juan basin.

What can research do for a specification product?

We manufacture a "specification" product—cast iron pressure pipe. It is purchased under standard specifications set up by engineering organizations representing users of the product, consultants and manufacturers. Meet the specifications and the customer is satisfied. The question is whether the manufacturer should be satisfied.

About 20 years ago we decided to find out what research could do for a "specification" product. The function of Industrial Research was then, as it is now, to develop a better product at the same, or if possible, at lower cost. We built and equipped a Research Laboratory.

What research has since done for our product is a result best known to our customers! After all, specifications only establish a "floor" beneath which quality standards must not fall. Through research we have steadily elevated those standards and, through quality control, have seen to it that they are adhered to.

Progress made by individual companies eventually leads to higher standards which must be met by all makers of the product. And progress in the production of cast iron pressure pipe is important to water, gas and sanitation utilities as well as to the public they serve. The key to such progress is Research.

To further our Research program we recently dedicated a new, even larger and finer research laboratory and developmental foundry at our plant and main office in Burlington, New Jersey.

FOR WATER, GAS, SEWERAGE AND INDUSTRIAL SERVICE

U.S. PIPE & FOUNDRY CO., GENERAL OFFICES, BURLINGTON, N. J.

America's largest producer of cast iron pressure pipe

EDWARD TITUS

THERMALLY THINKING

Watch Federal Housing

EVERY GAS COMPANY, particularly in its sales department, should have one or more copies of the Housing Act of 1949. And having obtained the copies, a few of the company's executives should read it through.

Reading the act will take perhaps 20 minutes. And it can be understood after about three or four days of study and discussion.

A handful of billions of dollars will go into housing in the next few years for various programs under this act. The electric competition already is trying to grab off as much of this business as possible.

The sum of $1750 per room will be allowed. *But* up to $750 per room additional will be permitted when local authorities can show inability to meet the cost of sound housing at the lower figure. It would therefore appear that local authorities, in order to assure that investment of public funds in these projects would be put into sound and modern equipment, might be able to specify heat controls and automatic pilots.

Selection of fuels for ranges, water heaters, refrigerators and house heating will be done by local authorities guided by a federal formula soon to be issued.

Federal agencies having to do with housing include first the Public Housing Administration, concerned with federally aided slum clearance projects. This agency has been divided into 11 regional offices, which are the places to get acquainted.

The Wherry Bill sets up another complete housing program. It provides for construction by private contractors on defense land. Local commanders of posts are the king pins.

Still another program will be construction of federal buildings themselves—post offices, office bulidings, army camps and hospitals, the last two presenting an obvious opportunity.

There are tricky angles. For instance, in areas where it is customary for the purchaser to supply the cooking range, it may be to the advantage of the builder to provide an "all-electric" home, possibly to the disadvantage of the future owner. The builder must put in the wiring anyway for lights and various devices. He is held to a close budget by federal requirements. And he may save a little money by not providing for gas. But the owner in the near future and the distant future pays. He probably pays more to get the electric equipment in, and the chances are good he pays more as the years go by.

The proponents of the competing fuel are playing an aggressive game, with governmental influence perhaps on their side in some areas.

Alertness will pay off.

After East Ohio, What?

THE FORWARD MARCH OF THE GAS INDUSTRY as a whole won't be seriously impeded by the Supreme Court's decision in the East Ohio case.

The court, in a 5 to 2 decision, held that East Ohio is subject to regulation, under the Natural Gas Act, by the Federal Power Commission in Washington, although the company operates entirely within one state.

The decision creates headaches for East Ohio, and doubtless certain individuals in Washington are licking their chops with glee over the fact there are some 43 cases involving other companies which now will doubtless come under some degree of federal regulation.

Utility people over the last two decades have acquired thick skins, and they can take it. The court's ruling will confuse the picture a little, and cost money and a lot of trouble to keep different sets of books to conform to both state and federal rules. And the decision will be more burdensome to some companies than to others. For some it may introduce the "vanishing rate base" problem.

The decision has a bearing on the case of the New York companies, including Consolidated Edison, Brooklyn Union, and Kings County Lighting. The commission decided once that these companies came under its jurisdiction and on the rehearing presumably will reassert this decision.

It appears, however, that the New York companies will be fortunate in that the procedures required by the New York State Public Service Commission happen to be similar to those of the FPC.

Most important is the principle involved—the leaf by leaf gobbling up of local liberties by Washington.

And it is of interest to note a few points in the dissenting opinion, written by Justice Jackson and joined in by Justice Frankfurter.

"If the commission had foreshadowed its present course," Justice Jackson wrote, "I do not suppose the act would have passed, for it certainly would have evoked resistance of the state regulatory agencies, instead of their support . . .

"I think that observance of good faith with the states requires that we interpret this act as it was represented at the time they urged its enactment, as its terms read, and as we have until today declared it, *viz*, to supplement but not to supplant state regulation . . ."

Unquestionably there will be a valiant attempt at the present session of Congress to amend the Natural Gas Act to exempt gas operations within a state from FPC control.

State commissions, through the National Association of Railroad and Utilities Commissioners, will be active.

These efforts will encounter rough sledding, due principally to expected White House opposition. But it's a fight worth trying for the states, to call public attention to Washington power grabbiness, if for no other reason. After all, there have been a lot of governmental ideas and methods that people said couldn't be changed, and finally they were. If not today, tomorrow.

MEANS

SAFETY . ECONOMY
PERMANENCY

FOR MAKING CONNECTIONS ON HIGH, MEDIUM OR LOW PRESSURE LINES

TWO TYPES OF INLETS

H-17650 VALVE TEE

H-17700 VALVE TEE

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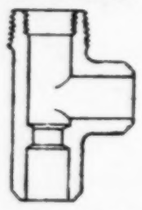	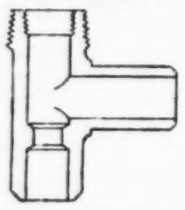	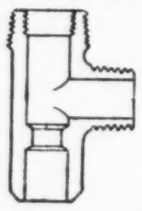
WELDING	DRESSER	THREADED
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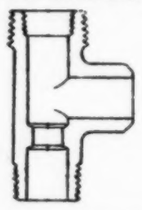	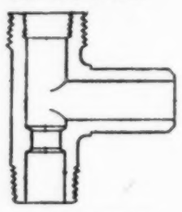	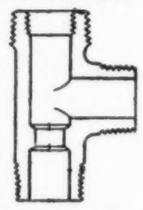
WELDING	DRESSER	THREADED
Sizes 1" and 1¼"	Sizes ¾" thru 1¼"	Sizes 1" and 1¼"

Use these service valve tees on either cast iron or steel pipe as the inlet connection may be welded or threaded, and the outlet supplied for any type of service connection —welding—dresser coupling—inside or outside thread. All operations may be performed under pressure without the loss of gas as the drilling and inserting of the bronze bushing and steel stem is easily done with the MUELLER "E-4" or "T" Machine.

MUELLER valve tees have a built-in valve with a metal to metal seat which may be operated without the use of a machine after the valve tee is installed and provides a means of quick and positive shut-off at any future time. These tees will withstand working pressures up to 125 lbs. p. s. i. with a generous margin of safety. The cap and seating of the stem in the open position at the top of the tee provides a double leak-proof seal.

When ordering specify quantity, size and catalog number. The size of the tee is determined by the size of the service pipe to be attached to the side outlet. Catalog 55 gives complete information. Write for your copy today.

DEPENDABLE SINCE 1857 FULLY WARRANTED
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OTHER FACTORIES: *Los Angeles, Cal.; Chattanooga, Tenn.; Sarnia, Ont. Canada*

GUY CORFIELD

TECHNICAL TRENDS

Heat Transfer Fluids

FLUIDS THAT CAN BE USED TO TRANSFER HEAT at temperature levels above those possible with water or low pressure steam have been utilized for many years for various applications.

One of the most familiar is Dowtherm. In 1947 the Institute of Gas Technology, in a research project for the AGA committee on domestic gas research, made a study of "Supplying Household Heating Services by High Temperature Circulating Liquids and Vapors." This study listed the properties of 10 fluids that were available at that time. It was concluded that "from an analysis of the chemical and physical properties of the potentially available heat transfer fluids presented in this report and from the calculations of the potential thermal efficiencies, it does not appear that present domestic gas appliance thermal performance can be exceeded by substituting vapor-liquid or liquid systems. These fluids apear to offer their greatest opportunity where continuous operation and uniform temperature distribution over large areas at levels above normal steam pressure are essential."

Recently the Carbide & Carbon Chemicals Corp. announced the availability of two more fluids for heat transfer up to 500°F, synthesized from polyalkylene glycols and designated as Ucon 50-HB-280-X and Ucon LB-300-X. They will burn at about 600°F and spontaneously ignite at about 745° F. The first is water soluble and the second is not.

Monsanto Chemical Co. has also developed a new liquid for the same general purpose, a partially chlorinated biphenyl named Aroclor 1248, with a boiling point of 644°F. It is classed as non-inflammable but will ignite at a temperature above 1300°F. It is non-corrosive to steel, copper, brass and bronze. An industrial gas fired furnace installation is described, with input of 200,000 Btu per hour, wherein this liquid is used for a special heat transfer job where chemical processing requires heating of materials to exactly 575°F and no higher (as otherwise deterioration of product will take place). The Aroclor is pumped through steel pipe heating coils in the gas furnace, with control of gas flow to keep the liquid at the desired temperature, and thence to the processing section.

Soil Heat from Carbon

A POSSIBLE NEW AND EXTENSIVE USE for carbon black, now being explored by agriculturists, is for mixing into the top layer of soil to increase the soil temperature. It is asserted that the carbon makes the soil darker and therefore increases the absorption of heat from the sun; and that this is particularly beneficial in the colder climates because the frost thaws out faster in the spring, and the soil stays warmer longer in the fall, thus both hastening and extending the growing season. In the tests so far, between one and two tons of carbon black have been applied per acre, mixed to a depth of approximately 2 in.

ASTM Standards

OUR TECHNICAL PEOPLE ARE GENERALLY AWARE of the continued activity of the Americal Society for Testing Materials Committee D-3 on Gaseous Fuels. As discussed on this page in the February 1947 issue, this committee issued its first publication, D900-46T, Tentative Method of Test for Calorific Value of Gaseous Fuels by the Water Flow Method, early in 1947; it has now become a full-fledged method.

Two more "tentative methods," prepared by this committee, were approved at the September 1949 meeting of the ASTM Administrative Committee on Standards, and are now available to industry. These are: D1070-49T, Determination of Specific Gravity of Gaseous Fuels; and D1070-49T, Measurement of Gaseous Fuel Samples.

The specific gravity publication as described in the *ATSM Bulletin*, furnishes means for measuring the specific gravity of gaseous fuels including LP-Gases, in gaseous state at normal temperatures and pressures. The apparatus selected is sufficiently varied in nature so that one or more of the methods specified may be employed for laboratory, control, reference, or any purpose where it is desired to know the relative density of a gas compared to dry air. The direct weighing method is specified for reference test purposes and for calibration, where exceptional accuracy is required or the gas is to be used for the calibration of specific gravity instruments. As this procedure is not practical for field determinations, two acceptable methods using commercially available balances, the Ac-Me Balance (4-spring type) and the Arcco Anubis Recording Gas Gravitometer, were selected. In the acceptance of these two instruments for use, it is not intended to imply that there are not other equally accurate and satisfactory instruments commercially available, or that others will not be developed in the future.

The measurement publication provides means for measuring quantities of gaseous fuels samples including LP-Gases, in gaseous state at normal temperatures and pressures. The equipment selected is sufficiently varied in nature so that one or more of the methods prescribed may be employed for laboratory, control, reference or in fact any purpose where it is desired to know the quantity of gaseous fuel sample under consideration. The unit of measurement is the standard cubic foot. Items covered are standardization of measurement units, limitations of various measurement methods, standard methods for calibrating apparatus, and development of allowable tolerances and probable errors.

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7,000,000 C.F.H.

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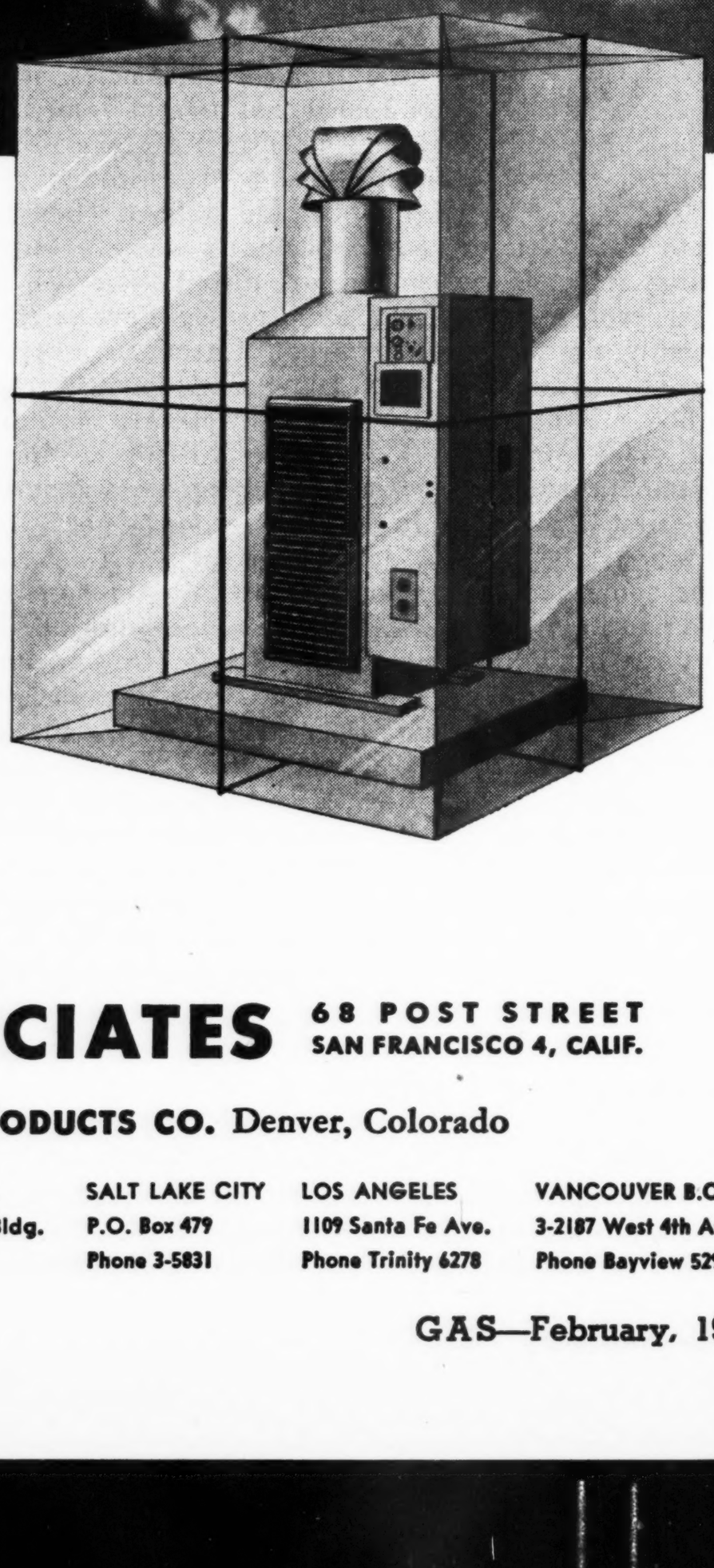

MORE THAN 600 USERS OF LP-GAS, from large industries and utilities to small town gas plants, rely on GASAIR, the proven packaged gas plant.

This fully automatic, self-contained vaporizer-mixer unit fits any plant layout, cuts installation and maintenance costs, provides a dependable supply of clean, rich fuel. Simple and safe in design; requires no building to house it; precision-built for years of trouble-free all-weather operation. Available with direct-fired, steam or water-heated exchanger. Ideal for peak-shaving, enriching, stand-by or 100% operation.

Call on our technical staff for complete LP-Gas engineering service, installations and replacement parts. Write, wire or phone today for details and a list of GASAIR installations.

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STANLEY JENKS

PROMOTIONAL NOTES AND NOTIONS

Whooping up Sales

THE FLAIR FOR SHOWMANSHIP, an essential ingredient in modern sales promotion, has never been better illustrated than in the gratifying results of the Old Stove Round-Up. Those utilities, from Maine to California, which have taken the original idea and dolled it up with all the trappings, chuck wagons, chaps, and sombreros and whooped it up with local dealer contests, tie-in advertisements, and "pep" meetings, have really gone to town and written themselves the finest kind of base load insurance policy.

Nothing succeeds like success, and the success of this nationally promoted campaign, with such enthusiastic support at the local level, presages even bigger and better sales programs in the gas appliance field.

Television "commercials" are an outstanding example of how you have to intrigue people into being interested in your product or service. Looking back through the years to the days when we were pioneering automatic gas water heating service in a relatively high-rate manufactured gas territory, I remember one outstanding stunt demonstration that got us more prospects and sales than any other.

It sounds crazy, but it certainly paid off. We hooked up a gas storage water heater and a bathtub in our main street display window and lined up a colored mammy (she could have been the original Aunt Jemima) to give her woolly-headed pickaninny a bath every half-hour one Saturday night. The door of the gas chamber was open so that the crowds who gathered could see the gas come on and shut off automatically. A special police detail was needed to keep the spectators from blocking traffic completely. Salesmen mingled with the spectators, handed out literature, and got plenty of people into the store to sign up for 30-day free trials, most of which developed into sales.

That happened more than 25 years ago, but, like the Old Stove Round-Up, which is by no means original with the present campaign, a good idea is ageless, so long as it is kept interesting. Otherwise, 90% of the Hollywood or radio script writers would have starved to death years ago.

Commercial Appliance Improvements

THE COMMERCIAL GAS LOAD, lacking the glamor of the domestic and home heating load and the spectacular volume of the industrial load, nevertheless has a unique importance in our service pattern, because it exists for the most part in a public atmosphere of chromium and neons.

The AGA Laboratories' Research Report No. 1130 "Study of the Factors Affecting the Application of Gas to Counter Appliances (Dry Food Warmers)" is a signal contribution to the further gasification of restaurants.

Contrasted with the conventional steam table, where flue gases heat water in a pan below the food receptacles, the dry food warmer circulates hot gases around the food containers, and, whether the heat is transferred by convection or radiation, the special advantage lies in the ready and flexible control of temperatures to prevent food spoilage.

My friend Joe, who operates my favorite roadside diner, likes the idea a lot, and, if he's typical (though in my estimation, he's considerably above the average), there should be quite a market for this commercial counter appliance, seeing there are already several makes on the market.

Good Reading

THE CHANGING TIMES are producing better and more instructive advertising. Anybody who passes up the advertisements in this or any other publication is seriously neglecting his education.

During the war, and until production caught up with demand, appliance manufacturers, for the most part, used advertisements like Christmas cards—they just wanted to be remembered.

Today, advertising is back in its traditional stride, creating demand and making sales points. New features are described and illustrated, and the "whys" and "hows" answered. An alert merchandiser knows more than his own merchandise. He knows the other fellow's too, so that he can discuss his appliance advantageously from any conceivable angle.

Thus equipped, he has the essential confidence to tackle today's buyers' market and put over the sales.

So, by all means, read the ads. It pays.

Public Welfare

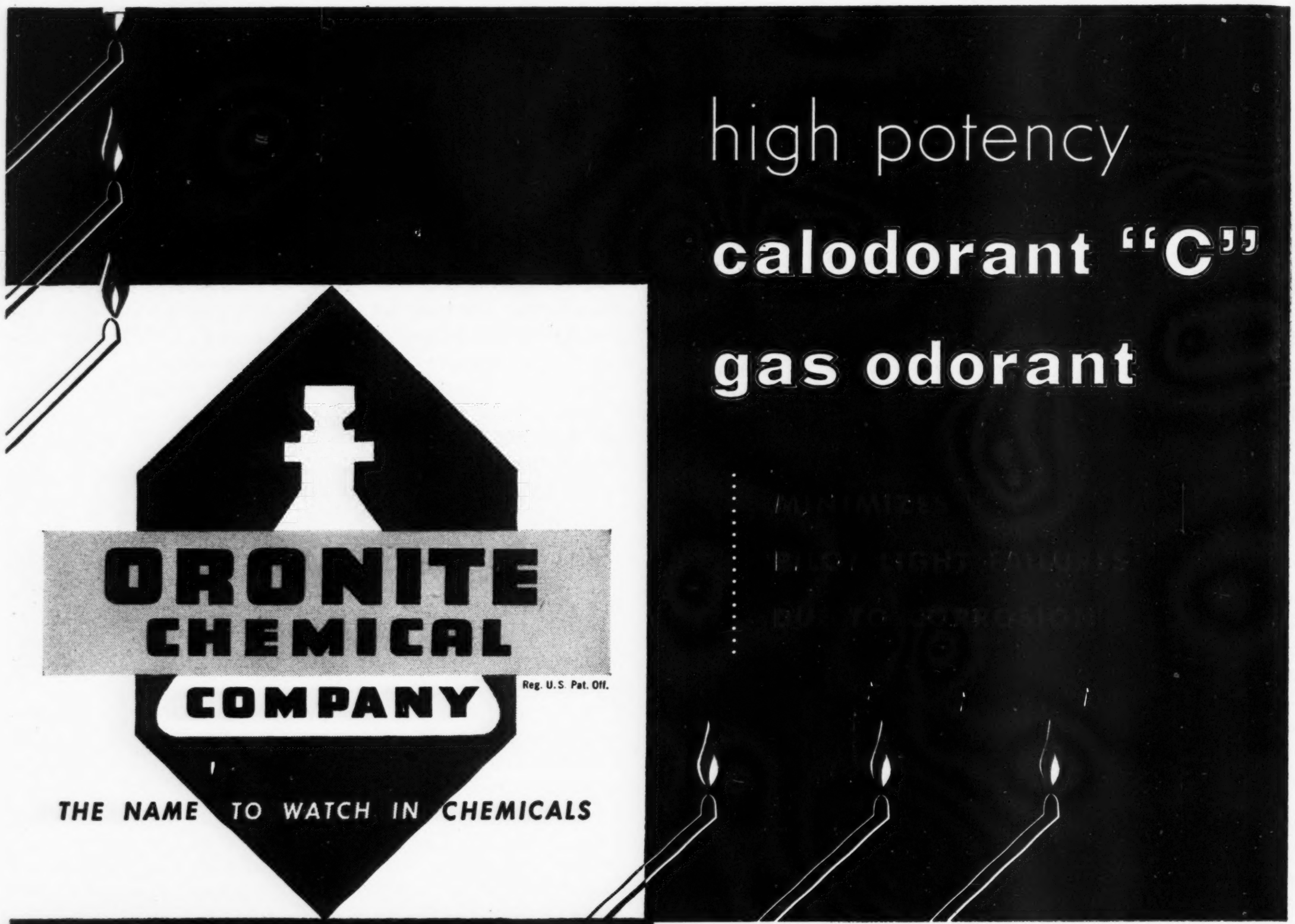
THE BEGINNING AND END of all utility service is to improve the community served, and, by constant diligence and intelligent management, anticipate the requirements of its customers.

As you cannot help but know from the wide publicity it has received—even my British friends have been twitting me in recent letters—New York City this winter has been expe-riencing a serious water shortage.

They had a shaveless Friday, when the badge of honor was an unrazored jowl. Signs appeared in restaurants "Please save water," and the conventional glass of drinking water with a meal was only supplied on request. While abnormal drought conditions precipitated the crisis, it must be recognized that fundamentally a failure to anticipate increased demands for water service is the real cause. Here we have the world's wealthiest city, and yet it lacks ample facilities for a necessary utility service. As city managements go, New York has able administrators and first-class technicians in the water bureau. It would seem as though it is the system itself —political management—that has created this situation.

Perhaps the meatiest comment of all was that of a New York taxi driver, when, discussing the water shortage, he said, "You'd never see Con Edison caught like this with its pants down."

And still there are people who think the next step to Arcadia is the political ownership of our public utilities.



Most pilot light failures in space and water heaters have been traced to the corrosion of the pilot light tubing and tip. This corrosion is caused by the thermal breakdown of sulfur compounds in the gas; some odorants contribute heavily to this sulfur. Minimize pilot light failures by using Calodorant "C" which contributes only ⅛ of a grain per 100 cf and has a thermal breakdown temperature of over 900° F.

Extensive tests have proven Calodorant "C" a close approach to the ideal as a natural gas odorant. It is completely stable, assuring adequate odorization throughout the line. It reaches an odor level plateau which is far below the nuisance leak level. In every way, Calodorant "C" Gas Odorant is built to the industry's specifications. Write for full particulars about this new concentrated gas odorant which has been 5 years in the making by men who have had over 20 years' experience in gas odorization.

Where Is Gas in the Television Picture?

The competition has the jump on us in many important localities, GAS survey discloses

This GAS staff survey was the outgrowth of a one-man campaign launched a couple of months ago (in the December 1949 issue) by Stanley Jenks, conductor of the "Promotional Notes and Notions" column which appears as a regular feature in this magazine. Mr. Jenks, who writes as he pleases, was taking the gas industry—both utilities and manufacturers—to task for its alleged failure to keep up with the competition in exploiting this new medium.

Of course, Mr. Jenks doesn't cover the entire nation, and since television is still pretty much of a local affair, we suspected that his charges were being applied a bit too broadly. Unsolicited comment from several sources within the industry showed that while Mr. Jenks stood on firm ground in his own bailiwick, he was somewhat off base in certain other areas.

Thus, the survey. Not to prove anyone right or wrong but to get the true facts was the aim of this poll. We hope these facts will afford guidance to all utilities as they ponder over the question, "Should we use television?"

THERE are 2,780,000 new promotional tools in the markets of America today. Is the gas utility industry using its share and using them properly?

Exclusive

Frankly, no, in the opinion of H. E. Eckes, director of advertising and publicity for The East Ohio Gas Co., Cleveland.

Mr. Eckes is in a good position to know, being a member of AGA's advertising and publicity committee. Here's what he had to say in replying to our queries about his company's use of television:

"It is our firm conviction that this medium holds great promise particularly for a demonstration-type program . . . It strikes us that widespread activity on the part of the gas industry is immediately urgent. Only if gas distribution companies and gas appliance manufacturers step into the breach now can the trend to show electric appliances in every program presented on television be halted.

"I keep a local box score on gas-vs-electric appliances on television shows programmed from three Cleveland stations and at present the score is 8 to 1 against us (seven programs originating in New York).

"The trend alarms me."

How much basis is there for this alarm, nationwide?

Our own box score might supply the answer to that one. We sent questionnaires to 46 companies in 42 cities now served by television stations. Thirty-five replied, and scanty information on two others is in our files. Of the 37 of which we have knowledge, 11 are using television. That's under one-third.

Twenty-six don't use it. Why?

"There are not sufficient television sets in our area to justify it," reports S. E. Cowan, sales manager, Mountain Fuel Supply Co. The competition, incidentally, makes no use of it, either.

Kenneth Fellows, advertising manager for Houston Natural Gas Corp., voices a slightly different reason:

"Houston to date has only one television station. Thus far it has not qualified as an advertising medium to serve our rather elongated company system, which comprises 20 counties along the Texas Gulf Coast."

Across town, United Gas Corp. seems to have its mind pretty well made up. Says J. O. Jackson, appliance and sales promotion director.

"We do not use television and have no plans at this time for doing so."

For one company, our survey is a bit early. Television is included in the advertising budget for 1950, reports G. A. Trester, advertising manager, Milwaukee Gas Light Co., but as yet the budget had not been given final approval by management.

Perhaps the quality of television programs is the

Louise Winslow's "Through The Kitchen Window" show for East Ohio Gas Co., Cleveland, has brought tremendous "viewer" response. Currently the show is playing an important role in an experiment that may make television history.

basic deterrent. That would appear to be the objection of Lone Star Gas Co., Dallas, whose advertising supervisor, L. C. Roberts, has this to say:

"We are watching television and are in the process of making up our minds as to what will be the best to do with it, if anything.

"What programs we have seen in this area on any kind of product have not impressed us much."

Is It The Last?

Or maybe cost is the largest present consideration. Seattle Gas Co. hasn't been using it (although it might later) for just that reason. Here's the reaction of Norbert O. Fratt, vice president in charge of sales:

"We have not used any (television) although we have considered it. The cost is pretty high here and with a rather limited advertising budget, we have not felt as yet that we are in a position to schedule any. It may be that in our fall Round-Up we will buy some spots. Some of the electric manufacturers have been using trailers, particularly Westinghouse. I don't know what the results have been, but I imagine it is going to be a powerful medium."

Costs are holding San Diego's plans in check, too. F. M. Raymond, advertising manager of San Diego Gas & Electric Co., says he is "sorry to admit that our experience in television is yet to happen."

"We have, however, contracted for some television advertising promoting electric blankets during January and February, and our experience in this initial endeavour will guide us as to future use of this new medium . . .

"The cost of local productions is still too high for use by member companies, condsidering the number of sets now operating in these territories."

Laclede Weakens

Some companies seem to be wavering, however. Perhaps foremost among those that are being tempted most strongly is Laclede Gas Light Co., St. Louis.

"We are not using television and have not used it as an advertising medium in St. Louis," writes R. D. Lewis, advertising manager. "However, we are investigating it as there has been a phenomenal increase in sales in the last three months.

"It is estimated that there are now 73,000 sets in use in St. Louis, of which 40,000 sets have been sold in the latter half of 1949. Ten thousand sets were sold in September alone, probably in anticipation of the World Series. We are, of course, tied in with the channel from Cleveland and broadcasts are now made over Channel 5 KSDTV."

The Philadelphia Gas Works Co., while it is not now using TV, intends to co-sponsor a program soon.

Pacific Gas & Electric Co., San Francisco, is also leaning toward the medium. Robert R. Gros, manager of publicity and advertising, while "standing on (his) own good reasons for not having joined the ranks of TV users thus far," says:

"Of course, we hope to make use of television, as well as radio somtetime in the future, whenever conditions permit us to engage again in our normal sales and advertising activities."

Physical reasons account at least in part for the fact that Delaware Power & Light Co., Wilmington, isn't using the medium. The city has but one station, which started operations in June, 1949. It is a member of the NBC chain, and has available for the use of local advertisers only 20-second breaks and 10-second time signals. Furthermore, it operates only from 5 p.m. to 11 p.m. daily. Being 30 airline miles from Philadelphia, it competes with stations there for listeners.

What's the Response?

That about sums up the sentiments of those who are not, for the several reasons mentioned, using TV. Those who were unimpressed by the programs offered might take heart after hearing what some of television's biggest utility boosters have to say about listener response to their programs. Says H. E. Eckes of East Ohio:

"Results have been measured by an impartial survey and by a statistical analysis of mail response to the programs. Both have been highly satisfactory! The telephone survey two months ago indicated a daily audience of 9000 to 10,000 viewers. Since then, with the great increase in set owners, we have probably added 3000 to 4000 viewers to the daily audience. During the first 22 weeks of programming 5664 requests for recipe bulletins have been received.

"It is our firm conviction that this medium holds great promise particularly for a demonstration-type program."

East Ohio has built up its faithful audience by maintaining high standards in its programs. The company went all out. It built its own studio and equipped it completely for its now famous show, "Through the Kitchen Window." Starring Louise Winslow and showing at 2 p.m. on Tuesdays, Wednesdays, and Thursdays, its entertainment is built around the theme of cooking, sewing, decorating, dressmaking, and the general subject of household hints. The advertising message is integrated with the show itself.

Co-Sponsorship

East Ohio cooperates with Perfection Stove, Youngstown Kitchens, and Domestic sewing machines: the three manufacturers co-sponsor the show, and the utility features their makes only.

No matter what product or subject is being discussed on a certain day, Miss Winslow always cooks with gas and is constantly plugging the advantages of the fuel.

Southern California Gas Co. and Southern Counties, Los Angeles, jointly sponsor a show which, according to Advertising Manager Jack Spaulding, consistently elicits a good response from listeners. Fan mail seldom drops below 400 a week and has been as high as 2800.

"We expect to continue sponsorship of the present show indefinitely, and shall continue to tie in with all local and national gas appliance campaigns," declares Mr. Spaulding.

Program Switch

The Southern companies have telecast almost continuously since Jan. 2, 1949. At that time they jointly sponsored "Fred Beck's Kitchen," a half-hour of entertainment and cooking demonstrations on Monday evenings from 7 to 7:30. But they weren't quite satisfied with the program and dropped it in May.

A few weeks later they joined Helms Bakeries as sponsors of "Tricks and Treats," featuring Corris Guy. A quarter-hour show aired Tuesdays at 7:15 p.m., it is devoted entirely to service. In addition to actual cooking and recipe preparation, it includes range and refrigerator demonstrations. The Old Stove Round-Up was plugged on the show last fall, with performers wearing cowboy hats.

Locally, range manufacturers are a big help in selling the cause of gas. Western Stove started with one-minute spots six days a week back in the fall of 1948. Last September, the company switched to a 15-minute show. It had already—the previous July—added a 5-minute service-type program. The company is now planning a third show over a third station!

Roper ranges are also being sold on a quarter-hour entertainment program in Los Angeles. This show, over which the company is enthusiastic, ran in the spring and the autumn of 1949, and reportedly will be resumed in March.

Three Shows!

Another enthusiast is Consolidated Gas Electric Light & Power Co., Baltimore. A combination company, ConGas has three shows, stresses the institutional on two of them.

"Homemakers Roundup" is a 30-minute show, appearing at 3 p.m. Tuesdays. It is broadcast direct from the home service bureau's kitchens.

"Industry Looks at Baltimore's Opportunities" runs 10 minutes, and the company is sufficiently pleased with results to have just launched a fourth series on the theme. Gist of the program is an interview of various city industrialists by a well-known local columnist. H. A. Sharret, manager of publicity says this program "does a good job of 'press' for the various industries."

"How Well Do You Know Baltimore," a 15-minute show on Thursdays, is the quiz-type. Ten questions are asked, with answers being given later in the show. The 10th question and answer contains the commercial. Said to be the oldest continuous show in the field, it has run since January 1948.

Choicest "Spots"

Admittedly, users of spots don't have the control over the type of programs employed that the regular sponsors of programs do. Yet this type of advertising has its adherents. Equitable Gas Co., Pittsburgh, has used station breaks for eight months—three per week, at 7:45 p.m. Wednesday, 9 p.m. Friday, and 10 p.m. Saturday. Equitable has good program breaks, each spot following, respectively, a news-sportcast, "We, The People," and "Cavalcade of Stars."

Since Equitable merchandises gas appliances, its 22- second plugs promote ranges, water heaters, and refrigerators. They always end with the phrase, "See your gas appliance dealer or Equitable Gas Co."

The breaks are on film, with sound.

For now, Equitable is content to hold its budget to this type of advertising. H. Briggs Jr., advertising manager, says that since there are only about 30,000 set owners in the area, it's still no mass medium. But, he adds, from 4000 to 6000 sets are being sold every month in the environs.

Mass Medium?

What are television's chances of becoming a mass medium?

Electrical Merchandising in January reported that 2.6 million sets were built in 1949. Only 975,000 were sold in 1948. Assuming that all of the first nine months' production had been bought and installed, the magazine figured that as of Jan. 1 2,780,000 were in use. Ninety stations now serve 55 marketing areas having 18.9 million families and a population of 62.8, says EM.

The records to which *GAS* had access when making up its questionnaire showed stations operating in 48 localities. But these records were three months old!

The third big drawback is cost, our respondents told us. F. M. Raymond of San Diego sums it up:

"The cost of local productions is still too high for many companies, considering the number of sets now operating in their areas. I suggested the (two-to-five-minute) shorts be sold on a rental basis so that they can be expressed from one company to another, according to a well-considered schedule."

Is This The Answer?

Mr. Raymond's conclusion: that filmed shorts be made available for use by member companies of AGA.

Mr. Eckes of East Ohio believes he has the real key to the problem in a new technique recently developed in Cleveland. A company there has found a way to film a 30-minute show in 30 minutes. That's something Hollywood has never been able to do. But this firm eliminates rehearsals, scene-changing, retakes, and editing. Three cameras are trained on the program—one is a master and two are used for obliques and closeups. All three roll continuously. Then, after the entire show has been shot, the best of the closeups and oblique shots are spliced into the master film.

East Ohio's "Through the Kitchen Window" was used as the guinea pig for this technique. Although the scheme was somewhat modified for the test, with the program being shot in three 10-minute sequences, Mr. Eckes pronounced it "successful."

The elimination of the usual weeks of rehearsing, editing, etc., has pared the cost of such a job from somewhere between $15,000 and $30,000 to $1000.

Is this the answer to the problems of those who find the present cost too high in relation to results? Mr. Eckes thinks it is, and late in January—after *GAS* had gone to press—he was scheduled to present his arguments before a meeting of the AGA advertising and publicity committee. He was going to back up his thesis with a showing of the guinea pig film in order to spur nationwide action.

That, in essence, is the answer to the question, "Where is gas in the television picture?" A careful detailing of all the replies and comments would be mere repetition of what has already been reported.

What the competition is doing would make a separate story. In a number of cases, electric companies are admittedly ahead of gas companies in their use of the medium; but this, of course, is an unfair oversimplification. Electric utilities and manufacturers naturally have a greater stake in the medium, a fact that accounts for at least part of the differential.

GAS, while holding iteslf to the role of reporter, hopes that the industry will continue to battle with all the effective weapons at its command to protect its base load.

The Cyclic Catalytic Reforming Process For Reforming

NATURAL GAS

By C. A. Schlegel

The coming of natural gas to the East coast has given gas engineers an opportunity to work out ways and means by which it can be utilized to the best advantage of the gas companies. A little over a year ago, The United Gas Improvement Co. and United Engineers & Constructors, in collaboration, undertook the development of a process to reform natural gas, which was to have the following characteristics:

Low investment cost, by utilizing existing plant equipment.

Low production cost, by using only natural gas as the raw material.

Flexibility to produce reformed gases of such various characteristics of heating value, specific gravity and analysis, that, when enriched with natural gas, would interchange properly with existing gas mixtures now used by gas companies.

Base load operation with natural gas, and peak load operation with LP-Gases.

The result of this work is the UGI cyclic catalytic reforming process (patent applied for).

TABLE 1: The U.G.I. Cyclic Catalytic Reforming Process on No. 16 Set at the Station "A" Plant of The Philadelphia Gas Works Through Dec. 31, 1949.

This is a summary of the resume of daily operating data originally included on Table 1. This summary is arranged to show total and average results during selected periods where plant requirements for a certain quality of C.C.R. gas were approximately consistent.

Period	Hours of Operation Average Per Day	Metered Reformed Gas-Mcf (Corrected) Avg. Per Set Day	Equivalent 530 Btu Final Gas-Mcf Avg. Per Set Day	Quality of Reformed Gas		Average Natural Gas Used per Mcf of 530 Btu Gas-Cu Ft
				Avg. Btu	Avg. H_2 to Inerts Ratio	
[1]June 1 thru June 8	23.85	7,159	10,673	283	1.10	573
[2]July 13 thru Aug. 1	23.85	7,709	11,722	270	1.05	564
[3]Aug. 2 thru Aug. 18	23.6	8,738	14,102	220	.63	535
[4]Aug. 19 thru Sept. 6	23.73	9,449	15,756	193	.44	537
[5]Sept. 6 thru Oct. 2	23.7	7,873	12,620	231	.57	544
[6]Oct. 6 thru Dec. 4	.....	.....	.....	.....	.....	.....
[7]Dec. 5 thru Dec. 31	23.8	8,309	12,593	.....	.....	.....
Totals	2743.6	948,044	1,497,707	.....	.....	.....

NOTE: During above periods, set operated practically 24 hours per day, there being less than 1% of lost time for cycle and other changes.

[1]Preliminary Starting Period; [2]Operations for Medium Inert Production; [3]Operations for High Inert Production; [4]Operations with Closed Stack; [5]Operations with Closed Stack; [6]Overhaul Period; [7]During this period plant loads did not permit continuous, separate measurement of results. Occasional measurement shows results as above.

The author, Carl A. Schlegel, is vice president and gas sales manager of United Engineers & Constructors Inc. (Philadelphia), and chairman of AGA's manufacturers section.

He has been associated with United Gas Improvement Co. and United Engineers & Constructors for nearly 40 years.

He was graduated from Stevens Institute of Technology in 1910, with a degree in mechanical engineering.

This paper was originally presented at the operators' section meeting, New England Gas Assn., held in Boston Jan. 18.

THE UGI process was applied by modifying a carburetted water gas set at the Station A plant of the Philadelphia Gas Works. After a three-week period of test operation, the set was taken over by the gas company and operated continuously between July 13 and Oct. 6, 1949, when the set was shut down for overhaul before the winter season. There was produced, over this total period, some 726 MMcf of reformed gas, equivalent to more than 1150 MMcf of 530-Btu enriched reformed sendout gas, as part of the regular daily sendout of the plant. The set was started up after overhaul and has been in regular operation since that time.

When a plentiful supply of natural gas became available at the station A works in the fall of 1948, the first experiments were made on a 12 in.-13 in. ID laboratory-carburetted water gas set, extending over a period of some six months.

Set Modified

In order to apply the very promising experimental results, thus obtained, to a commercial size unit, the No. 16 11-ft OD hand-clinkered carburetted water gas set at the station A works was modified for the process early in 1949. This set, originally installed in 1904, is provided with a separate gas train and metering for testing purposes.

The process, as applied to this set, is carried out in the 9-ft ID superheater only. This single shell contains a combustion chamber at the bottom where the process gas mixture and the heating gas mixture are cyclically introduced and pass upward, first, through a preheat bed and then through a catalyst bed. The reformed gas passes out of the set through a washbox and cold enrichment takes place at a convenient point beyond. The blast gases pass through a waste heat boiler and, when the proper connections are provided, the make gases will also pass through the boiler.

Except for a new automatic control machine, the existing facilities including the supply of hydraulic pressure, steam, air, and natural gas were utilized. The entire operation is automatic and closely parallels normal water gas set operation with no handling of coke and oil.

No Special Operations

Table 1 shows a summary of daily operating data during selected periods on the No. 16 set since June 1, 1949. These figures were copied from the daily works records as made by the regular P.G.W. works organization.

Up to Aug. 13, the gas company employees were instructed in operating methods. No special technical men other than those regularly found in the usual gas works organization are needed for routine operation. At present, one of the regular gas makers is used on each shift to operate the set, and this one man could probably handle the simple operating requirements of two or three units.

Of particular interest in *Table 1* are the data showing the daily hours of operation. Practically 24-hr operation is secured each day, which shows the reliability of the process. The total volume of C.C.R. gas made up to Dec. 31 was 948 MMcf which, when enriched with natural gas, is equivalent to 1500 MMcf.

Variations of Quality

The Btu of the reformed gas, the hydrogen-to-inerts ratio, and the percent methane in the reformed gas are taken from the daily gas analyses. The natural gas used per Mcf of enriched reformed gas is based on the metered natural gas to the set. The reformed gas from the set is metered by a test train station meter. The natural gas used for cold enrichment of the reformed gas is calculated.

Table 1 also shows that, from July 13 to Aug. 1, the Btu averaged 270. From Aug. 19 to Sept. 6, the Btu averaged 193.

These variations represent the varying quality of gases made on the reforming unit, at the demand of the gas company for blending purposes to meet the varying sendouts from the plant.

Station A receives, regularly, a constant daily supply of coke oven gas—roughly about 11 MMcf. The plant is equipped to produce carburetted water gas, fuel-bed reformed natural gas, and catalytically reformed natural gas. As the volume of sendout from the plant varies from day to day, the percentage of the oven gas to the total also varies. Consequently, the analysis of the C.C.R. gas must be varied to make the mixed gas interchangeable.

Units Shut Down

For instance, for a considerable period, about three weeks, in the latter part of August and early September, the total sendout from the station was low. The 11 MMcf of oven gas had to be handled. All of the sets in the plant were shut down except the C.C.R. unit and this unit supplied a gas which, together with modified natural gas when mixed with the oven gas, is suitable for sendout purposes. During this period, the stack was kept closed so that both the make and the blow gases went into the holder. These gases contained a low ratio of H_2 to inerts (about .5).

During the period when the sendout is higher, it is necessary to also make fuel bed reformed gas. The Btu of the catalytically reformed gas is increased and the ratio of H_2 to inerts is kept at about 1.1.

Hydrogen Varies

Table 2 shows the three principal types of gases that have been produced on the set to date to meet the sendout requirements.

TABLE 2: The U.G.I. Cyclic Catalytic Reforming Process; Actual Operating Results in Reforming Natural Gas Using Superheater Only of 11 ft x 11 ft x 11 ft Hand-Clinkered Set.

Column No.	1	2	3
Kind of Gas Produced	Medium Inert	High Inert	Closed Stack
Hydrogen to Inert Ratio	1.08 to 1.00	0.59 to 1.00	0.45 to 1.00
Quality of Gas			
Btu of Natural Gas	1035	1037	1033
Btu of Reformed Gas	268	201	192
Btu of Sendout Gas	530	530	530
Specific Gravity of Natural Gas	.61	.61	.61
Specific Gravity of Reformed Gas	.60	.71	.73
Specific Gravity of Sendout Gas	.61	.67	.68
Production			
Make per Set Day Reformed Gas—Mcf	7,837	9,175	9,630
Make per Set Day Sendout Gas—Mcf	11,907	15,520	16,086
Natural Gas Used per Mcf			
Reformed Gas Basis—Total cf	338	242	226
Final Gas Basis—Total cf	564	541	536
Gas Analysis	**Reformed**	**Reformed**	**Reformed**
% Ill.	0.0	0.1	0.1
% CO_2	5.1	5.8	6.3
% O_2	0.2	0.1	0.2
% CO	12.0	9.2	8.2
% H_2	40.7	30.8	26.5
% CH_4	8.9	7.2	6.1
% C_2H_6	0.6	0.2	0.1
% C_3H_8	0.0	0.0	0.0
% N_2	32.5	46.6	52.5

TABLE 3: The U.G.I. Cyclic Catalytic Reforming Process Estimated Operating Results in Reforming Natural Gas Using Standard U.G.I. 12-ft O.D., 10-ft I.D. Two-Shell Set.

Column No.	1		2		3	
Kind of Gas Produced	Low Inert		Medium Inert		High Inert	
Hydrogen to Inert Ratio	2.40 to 1.00		1.10 to 1.00		0.60 to 1.00	
Quality of Gas						
Btu of Natural Gas	1035		1035		1035	
Btu of Reformed Gas	355		266		192	
Btu of Sendout Gas	530		530		530	
Specific Gravity of Natural Gas	.61		.61		.61	
Specific Gravity of Reformed Gas	.46		.60		.70	
Specific Gravity of Sendout Gas	.49		.61		.67	
Production						
Make per Set Day Reformed Gas—Mcf	8,500		11,500		13,500	
Make per Set Day Sendout Gas—Mcf	11,500		17,500		23,000	
Natural Gas Used per Mcf						
Reformed Gas Basis—Total cf	443		338		246	
Final Gas Basis—Total cf	587		567		547	
Gas Analysis	**Reformed**	**Final**	**Reformed**	**Final**	**Reformed**	**Final**
% Ill.	0.0	0.0	0.1	0.1	0.0	0.0
% CO_2	4.0	3.3	5.2	3.7	5.9	4.0
% O_2	0.1	0.4	0.3	0.6	0.1	0.6
% CO	12.2	9.1	12.5	7.9	10.2	6.1
% H_2	51.6	38.7	40.4	25.7	30.6	18.3
% CH_4	15.2	35.0	10.0	40.6	8.3	42.8
% C_2H_6	0.0	0.2	0.0	0.4	0.0	0.4
% C_3H_8	0.0	0.7	0.0	1.0	0.0	1.0
% N_2	16.9	12.6	31.5	20.0	44.9	26.8
Waste Heat Boiler Steam Production						
Steam produced per Mcf - lb	50	37	35	23	21	12

NOTE: Column No. 1 is calculated, with the exception of the gas analysis which was taken from the operation of the reforming set by sampling the gas from the "steam cracking" portion of the cycle. Other data is taken from operation of commercial reforming unit. Steam production data is calculated.

It is interesting to note the variation in the percentage of hydrogen in these gases. Gases of higher hydrogen content have not been required but, from analyses made during the steam methane portion of the cycle and from pilot plant test data, it is expected that a gas with a hydrogen content of the order of 55% can be produced on the set.

Low NO Content

Tests made on the reformed gas show naphthalene content of 1 to 2 grains and H_2S content of less than 0.5 grains per 100 cu ft. The natural gas contains less than one grain of total sulphur per 100 cu ft.

The nitric oxide content of the reformed gas averages about 1 gram per million cu ft as compared with about 50 grams for the average fuel bed reformed gas. This has been found to be an important advantage at Philadelphia where a noticeable falling off of customer complaints occurred when using the C.C.R. gas.

There has been no evidence of thermal cracking which would liberate free carbon in the gas stream. There has been no indication of carbon deposits in the catalyst bed.

Long-Living Catalyst

The catalyst used is a commercial nickel catalyst. After 4½ months of operation, there has been practically no deterioration nor evidence of decrepitation or powdering. Its useful cracking life can be determined only by time, but it does seem reasonable to expect a life of at least a year. The operating savings of the process paid for the catalyst in the first 35 days of use.

From the experience with the No. 16 set, where the superheater only is used, it seems advisable to use a two-shell unit so as to provide enough combustion space to realize the full gas reforming capacity. Remodeling of existing sets to the process will, therefore, utilize both the carburetter and superheater.

Estimated Results

The design for new sets provides for two shells, each 12-ft OD and 10-ft ID comprising a large sized set, with similar designs for the smaller sets.

Table 3 gives the calculated results (based on the No. 16 set operation) which, it is estimated, can be secured on a new, two-shell, 12-ft OD unit. These daily capacities shown in this table, vary from 11 MMcf of 530-Btu enriched reformed gas (8.5 MMcf, 355-Btu gas from reforming set) with H_2 to inerts ratio of 2.40 to 1.00 to 23,000 Mcf of 530-Btu enriched reformed gas (13.5 MMcf of 192-Btu gas from re-

forming set) with H_2 to inerts ratio of .60 to 1.00.

Obviously, the production cost of 530-Btu enriched reformed sendout gas by the UGI cyclic catalytic reforming process will vary in each plant, according to local conditions. However, in one situation, assuming coke at $16 per ton, and natural gas at 30 cents per Mcf, it is estimated that the production cost of C.C.R. gas is approximately 4 cents per Mcf of 530-Btu final gas less than the production cost of fuel bed reformed gas.

Cold Enriched Blue Gas

About half of this saving is made through the substitution of natural gas for coke at a lower per therm price and the other half in operating labor (no fire cleaning), purification, maintenance, and greater steam production.

Table 4 gives some general comparative data on cold enriched blue gas, thermal and cyclic reforming of natural gas with cold enrichment.

The investment cost necessary to apply the C.C.R. process to existing carburetted water gas sets, will vary, depending on the size and condition of the existing shells and of the various parts of the set.

Cost of Changes

The estimated construction cost of making changes to an existing set with piping changes at the set and necessary changes to existing facilities in the generator house is approximately $15 to $25 per Mcf of installed daily capacity of 530-Btu enriched reformed natural gas. The costs per Mcf vary because the capacity of the apparatus in final 530-Btu sendout gas is so much higher with low H_2 inerts ratio than with a high H_2 inerts ratio.

The installation of new C.C.R. units adjacent to an existing generator house and feeding into the existing generator house gas off-take main is worthy of consideration since the existing carburetted water gas plant is available for standby and peak shaving purposes. The cost per Mcf for a new set is somewhat higher.

Developed for Natural

New C.C.R. units with their own train of apparatus are also feasible where the existing apparatus is otherwise loaded to capacity or for outlying peak load plants. The investment for such installations will have to be determined for the individual situation.

The process was developed primarily for base load operation with natural gas, as this is the cheapest raw material available. During the pilot plant experiments, a number of runs were made using propane, all of which operated quite successfully. The C.C.R. set at Philadelphia is not now equipped for propane operation, so no operating data is available on a commercial size set. The ability to use propane has advantages as reserve against failure of the natural gas supply and for use in peak load outlying stations.

Effect of Sulphur

Consideration has been given to reforming of gas oil in a C.C.R. unit. It is believed that the carbon problem can be handled without due stress. The big question is the effect of the sulphur in the oil on the catalyst. One of the manufacturers of catalysts advises that they have one which can be revived after two or three days of sulphur poisoning. Pilot plant work on gas oil is indicated.

In catalytic reforming, there is a maximum flexibility offering a straight steam reformed gas, on one end of the scale, to a closed blow operation on the other. The set has operated satisfactorily on a 530-Btu standard as to interchangeability for nearly three months in a large company under a wide variation of conditions. Laboratory tests have been made by that company which show satisfactory interchangeability on a 650-Btu sendout gas basis.

To determine whether an interchangeable gas in any particular situation can be produced, is peculiarly a local problem. It is felt that the process is flexible enough to match conditions likely to be encountered in most situations.

TABLE 4: Estimated Comparative Gas Production Data Using Natural Gas for Production of a 530-Btu Finished Gas for Interchange with .67 Sp. Gr. Carburetted Water Gas Using Natural Gas of 1030-Btu and .61 Sp. Gr.

Type of Production	Blue Gas Cold-Enriched with Natural Gas	Fuel Bed Reformed Gas Cold-Enriched with Natural Gas	U.G.I. Cyclic Catalytic Reformed Gas Cold-Enriched with Natural Gas
Apparatus Used			
Mech. Gen. C.W.G. Set	9'IDx12'x12'	9'IDx12'x12'	12'x12'
Dia. Carb. and Superh.	10' ID	10' ID	10' ID
Base Gas			
Specific Gravity	.58	.63	.60
Heating Value Btu/cu ft	280	390	266
Lb of Coke/Mcf	33.0	9.0	0
Cu ft of Natural Gas/Mcf	0	308	340
Make Per Set Day - Mcf	6,500	10,300	11,500
Finished Gas			
Specific Gravity	.59	.62	.61
Heating Value Btu/cu ft	530	530	530
Lb of Coke/Mcf	22.0	7.0	0
Cu ft of Natural Gas/Mcf	330	460	570
Make Per Set Day - Mcf	10,000	13,200	17,500
Comparative Costs-Cents/Mcf of Finished Gas			
Materials			
Coke @ $16 per ton	17.6	5.6	0
Natural Gas @ 30 cents/Mcf	9.9	13.8	17.1
	27.5	19.4	17.1
Coke @ $17.50 per ton	19.2	6.1	0
Natural Gas @ 40 cents/Mcf	13.2	18.4	22.8
	32.4	24.5	22.8
Savings in Other Production Costs			
Savings - U.G.I. C.C.R. Process Over Fuel Bed Reform. in Oper. Labor, Maint., etc. - cents/Mcf			1.0 to 2.0
Total Estimated Savings			
Total Est. Savings - U. G. I. C. C. R. Process Over Fuel Bed Reforming - cents/Mcf			3.0 to 4.0

NOTE: For an 11-ft hand-clinkered set, the fuel consumption for the base gas (blue gas) should be raised from 33 to 35 lbs and for the thermal reforming from 9 to 10 lbs.

'King Coal' Deposed By Gas In Ohio Brick Kilns

By O. O. Todd

MORE than 200 coal-fired, down-draft, beehive kilns are located in and adjacent to the Ohio river valley where a natural gas service is supplied by The Manufacturers Light & Heat Co. and The Natural Gas Co. of West Virginia, both member companies of the Pittsburgh Group of The Columbia Gas System Inc.

These coal-fired kilns presented a challenge to gas company industrial engineers. Their smoke and ashes spilling out daily were a constant reminder of the question in our minds: "Could natural gas be used in these kilns—and would natural gas help produce a better brick?"

Fuel Relationships

Therefore we decided to study the problem of the relationships of fuel to production. We have secured promising results. Marked progress has been made. There is every indication of natural gas displacing coal in many of these kilns, with the resultant new industrial gas load for the gas companies.

Before we went too deeply into the subject of burners, inputs and firing rates, we endeavored to analyze the whole subject of kiln firing. Here are the major points:

1. Combustion of natural gas differs considerably from combustion of coal. Gas must be burned under different draft conditions.
2. Natural gas will cost more than coal. However, the cost differential must be offset with savings in labor, with lower maintenance costs, greater convenience, an improved product, and numerous other potential benefits.
3. There must be a firing system of considerable simplicity that requires no special personnel training.
4. The costs of natural gas burners, labor, and materials for installation must be reasonable.
5. Gas burner operation must be stable and safe, with no danger of flames blowing out.
6. The burning operation must be efficient, to insure good production at reasonable cost.

BEEHIVE KILN of the type converted to natural gas use is shown above. Note slag piles that vanished when coal was exchanged for gas. The down-draft kiln has a 32-ft inside diameter and 10 firing mouths.

We were fortunate in securing the cooperation of a manufacturer of unglazed, unflashed bricks for our initial experiments in creating a gas-fired kiln.

Summitville's Problem

The Summitville (Ohio) Face Brick Co. produces a tonnage of brick that is high in comparison to the dollar volume of production. The company aided us in setting up an experimental installation of natural gas burners in one of its kilns *(Fig. 1)*.

We used a 4-in. high-pressure, inspirator type of mixer with a flame-reten-

Mr. Todd is manager of industrial sales, Manufacturers Light & Heat Co., Pittsburgh.

tion nozzle firing through a tuyere block *(Fig. 2)*. This arrangement is efficient and simple in operation. It is trouble-free, and economically priced.

The tuyere block and burner nozzle are mounted at a 45° angle. This directs the gas flame toward the crown of the kiln.

Moving Heat In

The nozzle and block were placed so the flame passed directly into the kiln interior without impinging on the firing-mouth arch or the bag wall. This placement moved the heat out of the firing mouth and lowered bag-wall and firing-arch temperatures. It reduced kiln maintenance to a minimum.

At the same time, we created a high turbulence of atmosphere in the kiln crown. Here hot gases tend to stratify. We placed almost all the heat in our gas into the kiln proper. This made for efficiency, as radiant heat losses from the firing mouths are considerably reduced.

One burner was placed in each firing mouth, with an individual control valve that could be used if needed. The 10 burners were connected to a 3-in. circular pipe manifold around the kiln, with identical piping for each burner.

Minimizing Labor

The 3-in. manifold was fed through one 3-in. lubricated plug valve *(Fig. 3)*. This connects to the main plant gas line. It was used as the control valve and shutoff when the kiln is shut down. Its use reduced firing labor to a minimum.

In operation, all the kiln burners were lighted. Individual valves were opened wide. The 3-in. main valve was then adjusted for proper firing rate, which was checked every four or eight hours. The single control valve was adjusted as needed.

Firing mouths were bricked up, with three removable bricks allowing for any adjustment of secondary air.

Damper operation for the flue was not used until the carbon burning was passed. The damper was then kept open about 50% of the extent used for coal.

First Performance

In its first few firing operations this simple, safe, inexpensive installation gave very pleasing results—so far, about as follows:

4.46 Mcf of 1050-Btu natural gas per ton of brick, or at 45 cents per Mcf, a fuel cost of $2.02 per ton of brick; 12.2 Mcf of natural gas per 1000 5½-lb shale brick fired to a temperature of 2000°F.

The grade of brick produced in the kiln has been very pleasing. There has not been a single flashed brick. They are clean and free from fly ash, and instances of their being stuck together are much more rare than with coal-firing. They are also more easily removed from the kiln.

TOP: A closeup of the 4-in. high-pressure inspirator burner setting at Summitville Face Brick Co. One of these burners was mounted in each of the 10 firing mouths.

CENTER: The single hand control has reduced firing labor to a minimum in the Summitville brick kilns. Manufacturers Light & Heat (Pittsburgh) helped the company accomplish conversion.

BOTTOM: One complete kiln at Summitville was equipped with 10 luminous flame burners, one in each firing mouth, in an attempt to establish the merits of both inspirator and luminous burners in kiln operation. Note blower at left which delivers air under pressure to each firing mouth.

Even Heating

The even heating of the kiln has been very encouraging. There is no great differential in temperature between bottom and top.

Progress of the brick firing is checked with Forrester shrinkage keys. These keys show that a uniform heat is maintained constantly.

Coal-firing cycles have been followed fairly closely. We are now just starting an experiment to speed up the firing, at the same time seeking to improve burning efficiency and other phases of operation.

We are testing the installation of high-pressure burners under actual operating conditions, using the most modern type of luminous flame burners, in an attempt to establish the merits of each type of burning *(Fig. 4)*.

Uniform Results

Results from each installation seem to be similar for the first firings. It is still too early to establish full comparisons.

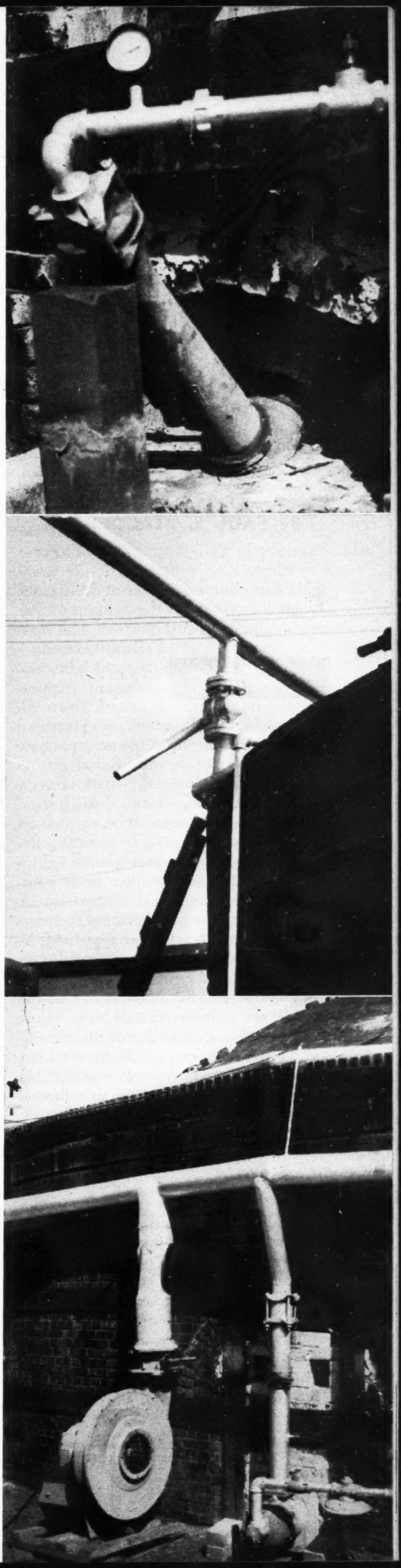
The cost of burners, piping and labor to outfit a 32-ft-diameter kiln with 10 firing mouths with the high-pressure burners should not exceed $750.

Among the advantages secured with the use of natural gas in this kiln was the elimination of coal, ashes and dirt adjacent to the kiln. This provided much-needed storage space for brick.

With gas, firing mouths and the bag walls do not need repairs. There are no clinkers to chisel out.

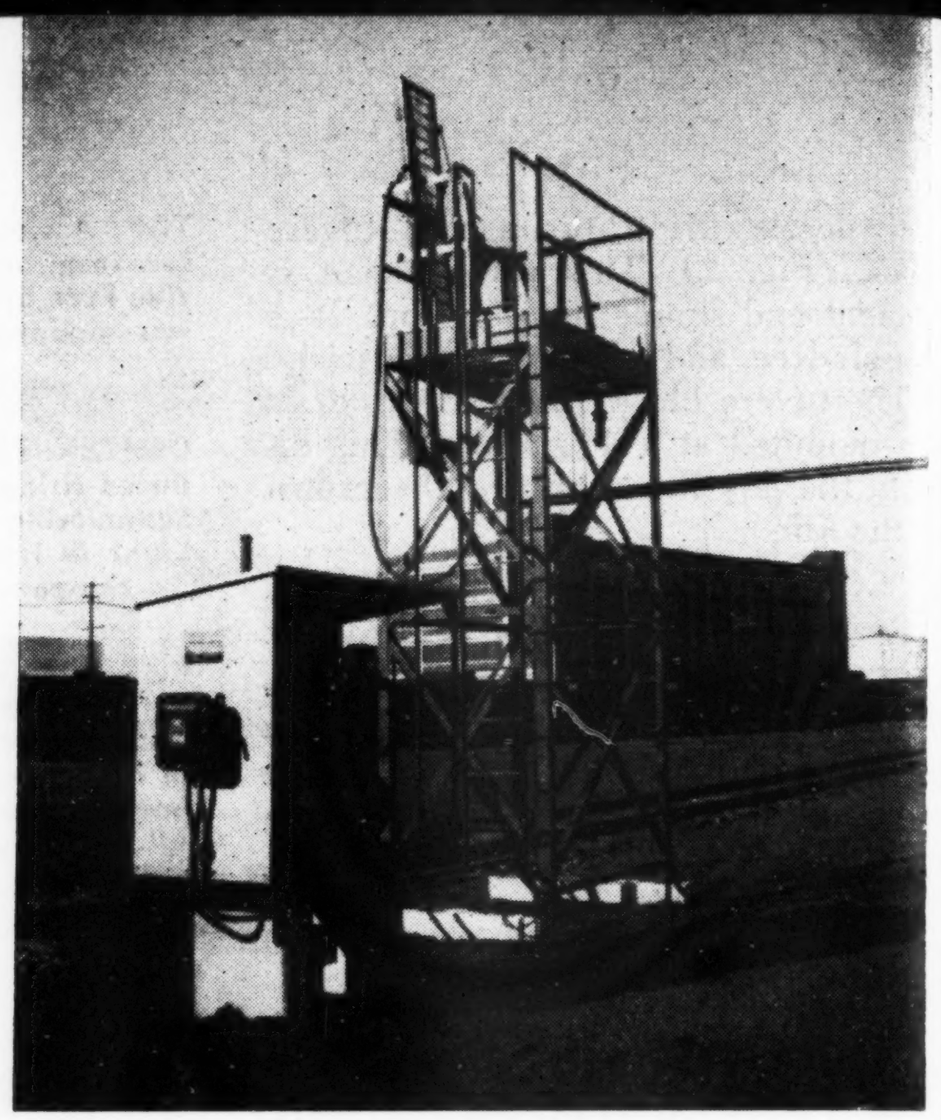
The flame retention nozzle and tuyere block make it almost impossible for the burner to be blown out.

On the basis of the data we were able to gather on this subject, one plant was encouraged to equip all of its nine kilns with natural gas burners.



Propane Plant Boosts New Haven Capacity

. . . propane-enriched producer gas will help Connecticut utility meet heavy demands . . .



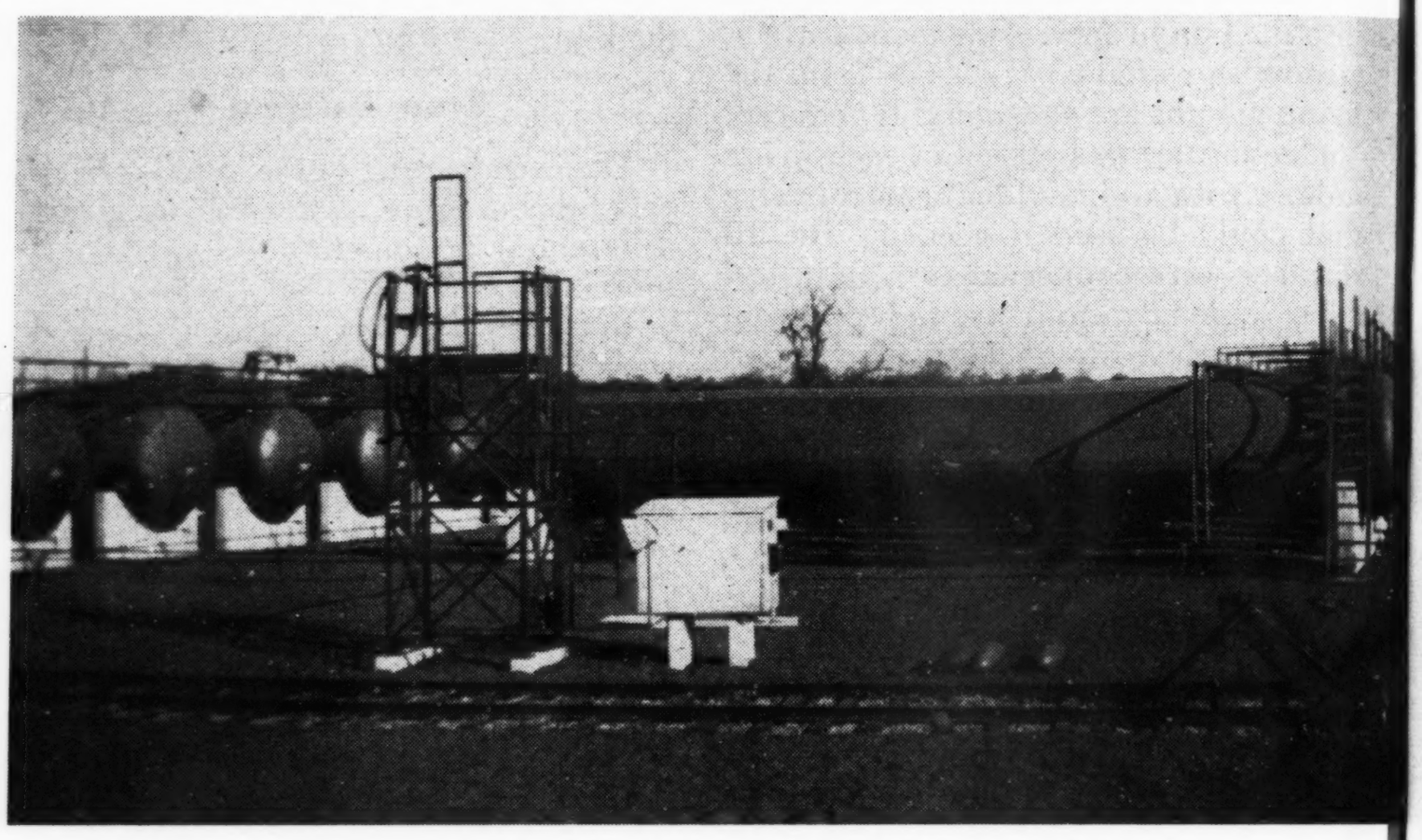
By PAUL E. PEACOCK JR.

FIVE million cubic feet of additional gas a day—that's the amount of gas now available to customers of The New Haven (Conn.) Gas Light Co. and to customers of The Connecticut Light & Power Co. in Hartford and other Connecticut towns served by that company. The additional gas is now available from the New Haven plant of The Connecticut Coke Co.

Exclusive

The additional gas will be a propane-enriched producer gas. To meet this demand, a new propane storage and equipment installation has just been completed at the New Haven plant by H. Emerson Thomas & Associates Inc., engineers and contractors of Westfield, N. J., a firm that specializes in LP-Gas engineering and contracting.

The new propane plant is one of the largest gas industry installations made during 1949. Consisting of 30 30,000-gal (water capacity), 250-lb working pressure storage tanks and considerable vaporizing equipment, the installation has several unique arrangements.



ABOVE: One of three unloading towers with compressor. Front and sides are removable.

BELOW: One of three batteries of ten 30,000-gal propane storage tanks, with one unloading tower in foreground.

The Problem

Connecticut Coke Co. has been supplying 21½ MMcf of gas daily to the utilities from its New Haven coke plant. This gas has been produced from the 70 Koppers-Becker type coke ovens of the company, augmented by producer gas from the company's four 10-ft ID Koppers-Kerpely gas producer sets. The producer gas has been used principally for underfiring of the ovens, with some being used to adjust and regulate the Btu of the coke oven gas.

The capacity of the gas producer sets is considerably over 1 MMcf per hour. Since present demand upon the sets is well under this amount they have been operated at only about 60% of capacity. This reserve capacity has given the company a valuable source of gas for expansion of the plant's gas output.

When the utility companies were faced with continuing load increases, the demand taxed the capacity of their own plants even after receiving the 21½ MMcf from Connecticut Coke Co. Connecticut Coke was therefore asked to assist in meeting the increasing load by supplying as much as 5 MMcf of additional gas per day.

Realizing that the company had the available supply of producer gas, Connecticut Coke began making tests and experiments for enriching the producer gas to bring it to the 530 Btu required. These tests were made with the assistance of the research department of Eastern Gas & Fuel Associates, parent company of Connecticut Coke. Various fuels were used in the extensive tests and during one such test approximately 100,000 gal of propane was used. The final result of the various experiments indicated that propane was the most logical enriching agent for the producer gas.

Designing the Plant

After deciding to use propane to enrich the producer gas, the company began laying out a general plan for the size and type of plant that would be required. The final decision was for a storage farm of 30 30,000-gal tanks and duplicate vaporizer installations, each capable of vaporizing up to 2000 gal of propane per hour. The size of the vapo-

Mr. Peacock is vice president, H. Emerson Thomas & Associates Inc.

rizers would allow for considerable expansion of the capacity if future developments required it.

General plans and specifications were drawn up by engineers of The Connecticut Coke Co. and some 15 or 16 companies quoted on various parts of the proposed installation. A contract was signed with our company for the engineering and installation work on a flat "turn-key" contract basis. The propane installation includes the 30 storage tanks which were installed in three batteries of 10 tanks each. The tank trim is somewhat of the conventional type except that there is a liquid eduction line in the top of each tank as well as the normal bottom liquid connection. There is a connection between the top liquid eduction line and the liquid unloading line so that liquid could be transferred directly from the tank cars to the vaporizers without being passed through the storage tanks.

Three elevated unloading towers are installed so that three tank cars can be connected and unloaded simultaneously. Each of the three unloading points has a separate unloading compressor and connects into dual liquid unloading lines and dual repressure lines. The dual lines are so connected and valved that propane can be unloaded from any one of the points and transferred to either of three tank batteries while butane, if desired, is being unloaded at one or both of the remaining towers and into the remaining batteries. By receiving butane into part of the storage system and propane into the remaining tanks, it would be possible to use butane liquid through the vaporizers and maintain sufficient pressure on the butane tanks with vapor from the propane tanks.

Unusual Connection

There is another unusual connection at the storage farm in the form of a by-pass or emergency vapor line. This line connects directly from the unloading vapor repressure lines to the vapor line going to the mixing equipment. The line is connected on the low-pressure side of the first stage regulator installation at the tank farm and has a regulator which is set a few pounds higher than the first stage regulators. By this connection the vapor may be drawn off quickly from unloaded tank cars without using the unloading compressor. During times when a dozen or more cars of propane must be unloaded in a day this connection will save valuable time. As mentioned, the first stage regulators are installed at the tank farm. The regulators are installed in duplicate with proper by-pass connections and gauges. From the outlet of this regulator station a 4-in. vapor line runs approximately 1100 ft to the vaporizer building where it connects into the vapor outlet line of the vaporizers. A 3-in. extra heavy liquid line runs parallel with the 4-in. vapor line and the two lines are installed on supports approximately 2 ft above ground for ease of maintenance. The lines run along the property line fence and are out of the way.

Progress on the installation was as follows:

Installation crew of contractor arrived on site	Sept. 6, 1949
First storage tank placed	Sept. 8
Last storage tank placed	Oct. 3
Propane unloaded into first battery of tanks	Oct. 29
Propane used in enriching on and after	Nov. 17
Propane unloaded into second battery of tanks	Nov. 26
Final completion of total installation	Dec. 10
Total elapsed time	96 days

Automatic Vaporizers

The two 2000 ghp steam heated vaporizers are installed in a vaporizer building near the point where the gas is to be mixed. The operation of the vaporizers is controlled automatically so that artificial vaporization is used only when a sufficient amount of vaporization is not received from atmospheric heat surrounding the storage tanks. The first-stage regulators are set for a discharge pressure of approximately 20 psi and the liquid supply to the vaporizer is controlled by a pressure shutoff valve set at 18 psi. So long as the tanks supply all of the vapor needed the pressure will keep the liquid supply valve closed. When the tank pressure drops to about 25 psi there will be a slight drop in the vapor pressure at the vaporizers, which will allow the liquid shutoff valve to open. Up to this point the control is of the conventional type. However, the vaporizers are of the "dry" type rather than the "wet" type in that no liquid enters the vaporizer chamber until artificial vaporization is required.

Steam supply to each vaporizer is by a temperature control valve. This valve has the control bulb installed within the vapor chamber of the vaporizer so that when no liquid is being vaporized only a nominal amount of steam is required to maintain the "set" temperature, which in this case is approximately 110°.

As the vapor pressure lowers and the liquid shutoff valve opens, liquid propane enters the vaporizer and reduces the temperature within the chamber. This temperature reduction opens the steam supply valve as required to maintain the 110° set temperature. By such a control a more uniform discharge temperature is possible than with the wet type of vaporizer.

A temperature control is installed in the liquid supply line in series with the pressure control valve. This temperature valve has its bulb in the vapor chamber also and is the type that closes on temperature drop. The setting of this control is approximately 10° under that of the steam control. Should low steam pressure or other conditions cause liquid to enter the vaporizer faster than the steam coil could vaporize it the temperature control in the liquid line would throttle the supply and hold it within the capacity of the steam coil. This serves to prevent flooding of the vaporizer vapor discharge with liquid propane as well as to maintain a more uniform discharge temperature of the vapor.

Beyond the vaporizer discharge connections is connected the 4-in. vapor supply line from the first stage regulators. Beyond this connection dual second stage regulators, which reduce the vapor pressure to approximately 10 psi, are installed. The vapor is metered at this pressure through a Roots rotary meter and passes to the Cutler-Hammer Calorimixer for mixing into the producer gas in the proper amount.

The producer gas is mixed with the coke oven gas and the two gases pass through the various purification equipment. The final production equipment is the naphthalene scrubber; the propane vapor is mixed into the gas stream at the outlet of this scrubber just ahead of the Centrifix[1], where the three gases are thoroughly mixed before being metered and delivered into pipelines for the utility companies.

The engineering, design, and general supervision of the installation was by Paul E. Peacock Jr., vice president of H. Emerson Thomas & Associates Inc.

Gratitude is expressed by the author to W. C. Wardner, superintendent; E. W. Montgomery, assistant superintendent; B. R. Hasselman, chief chemist; and to the various other personnel of The Connecticut Coke Co. for their assistance and cooperation in the installation of the plant and in supplying data for this article.

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[1]The author describes the Centrifix as a "trade-name article used to extract any carry-over moisture or scrubbing oil after the gas has passed through the napthalene scrubber. By certain louvres and veins the gas is given a swirling motion which causes the oil or moisture to separate from gas much as an extractor removes water from any material revolved at high speed. The Centrifix is not mechanically driven and depends on the velocty of gas to separate moisture or scrubbing oils.

"New Haven has not used the napthalene scrubber for some time, and gas goes through it as so much pipeline. After the propane was installed, the connection was made ahead of the Centrifix so that the velocity of the gas and the swirling motion of the gas passing through the Centrifix would thoroughly mix the propane with the gas stream. It is apparently doing a fine job of mixing, and this is important with the two gases having such a wide spread in specific gravity."

"from the laboratory"

How to Collect a Gas Sample From a High-Pressure Source

HEREIN are presented three papers slanted especially for the gasman in the laboratory.

They were originally prepared for the PCGA technical service group conference, Los Angeles, April 28-29, 1949.

Mr. McGlashen and Mr. Weiss are with Southern California Gas Co.; Mr. Schmidt is associated with Southern Counties Gas Co. of California.

By W. A. McGLASHEN

This article provides a description of equipment for the safe collection, from a high pressure source, of a representative sample of natural gas in a container having a safe working pressure considerably lower than that of the source pressure.

A description of a pressure relief assembly, fittings and conduit, with instructions for its assembly and use in gas sampling, is presented. This equipment will prevent the overpressurizing of conduit and container and eliminate unnecessary strain on valves and fittings resulting from repeated use of wrenches to make connections between the high pressure source of gas sample and the inlet of the gas sample container.

AS shown in the illustration, use is made of a pressure relief assembly which receives gas direct from the high pressure source through a ¼-in. high pressure valve. This pressure relief assembly is equipped with five dependable relief valves to insure that none of the equipment downstream of the outlet of the high pressure valve will be subjected to a greater pressure than the safe working pressure of the sample container, connecting conduit and fittings, even though the high pressure valve at the sample source is inadvertently fully opened during the sampling procedure. This eliminates the necessity for using high pressure fittings and conduit, which may be damaged by repeated use, between the high pressure source of sample and the inlet valve of the sample container.

In practice each operator is furnished with the equipment described in the sketch. This equipment includes a gas sample container (11) and the special gas sampling equipment consisting of the pressure relief assembly made up of items (5), (6), (7), and (8), the sampling tube assembly made up of items (9) and (10) and, for sampling at non-routine sample points, a spare assembly made up of items (2), (3), and (4). The total weight of all of this sampling equipment, exclusive of the sample container, is about 4.5 lbs.

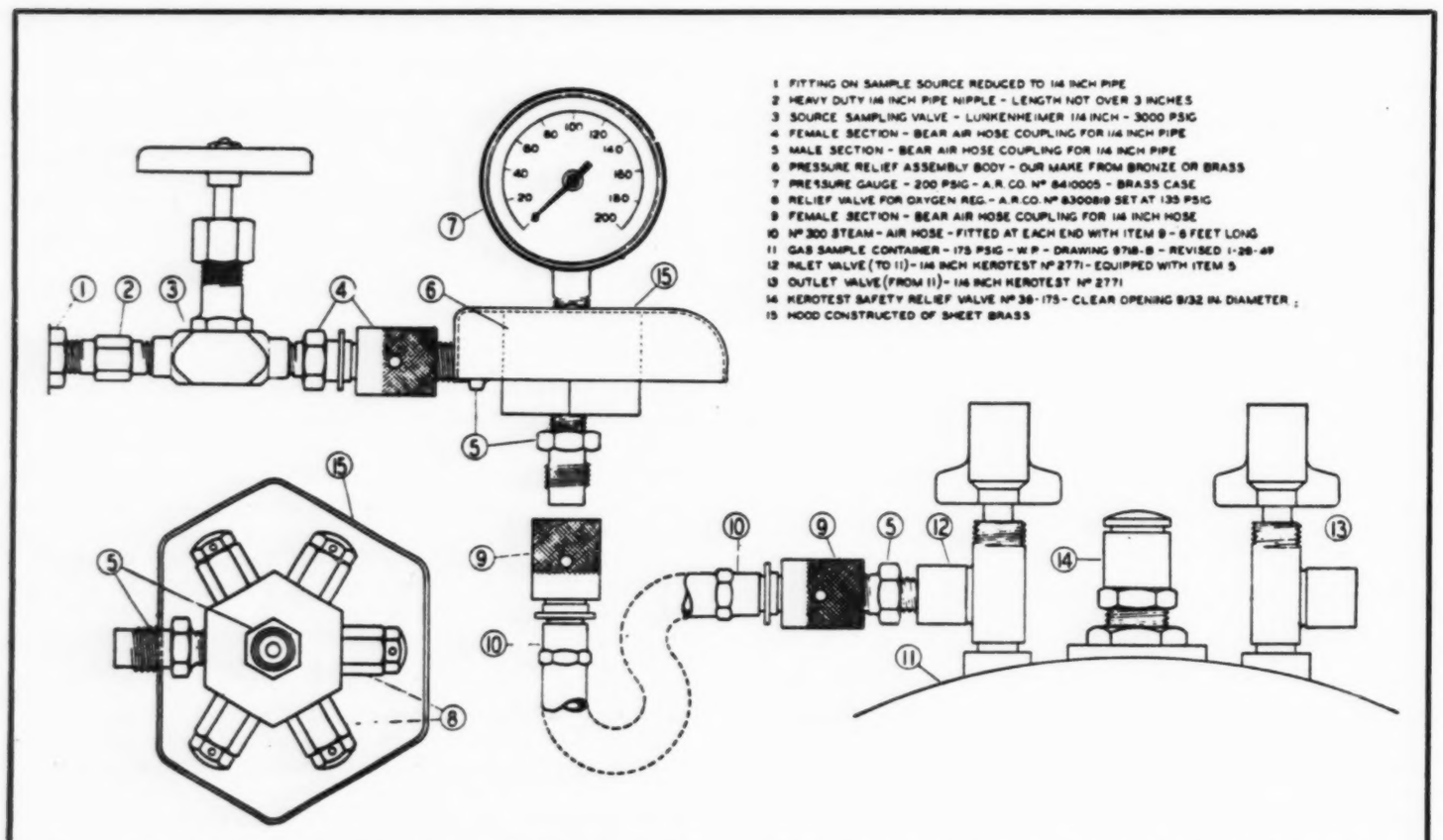

1 FITTING ON SAMPLE SOURCE REDUCED TO 1/4 INCH PIPE
2 HEAVY DUTY 1/4 INCH PIPE NIPPLE - LENGTH NOT OVER 3 INCHES
3 SOURCE SAMPLING VALVE - LUNKENHEIMER 1/4 INCH - 3000 PSIG
4 FEMALE SECTION - BEAR AIR HOSE COUPLING FOR 1/4 INCH PIPE
5 MALE SECTION - BEAR AIR HOSE COUPLING FOR 1/4 INCH PIPE
6 PRESSURE RELIEF ASSEMBLY BODY - OUR MAKE FROM BRONZE OR BRASS
7 PRESSURE GAUGE - 200 PSIG - A.R.CO. Nº 8410005 - BRASS CASE
8 RELIEF VALVE FOR OXYGEN REG. - A.R.CO. Nº 8300810 SET AT 135 PSIG
9 FEMALE SECTION - BEAR AIR HOSE COUPLING FOR 1/4 INCH HOSE
10 Nº 300 STEAM - AIR HOSE - FITTED AT EACH END WITH ITEM 9 - 6 FEET LONG
11 GAS SAMPLE CONTAINER - 175 PSIG - W.P. - DRAWING 9718-B - REVISED 1-28-49
12 INLET VALVE (TO 11) - 1/4 INCH KEROTEST Nº 2771 - EQUIPPED WITH ITEM 5
13 OUTLET VALVE (FROM 11) - 1/4 INCH KEROTEST Nº 2771
14 KEROTEST SAFETY RELIEF VALVE Nº 36-175 - CLEAR OPENING 9/32 IN. DIAMETER
15 HOOD CONSTRUCTED OF SHEET BRASS

Fig. 1. Use of a pressure relief assembly which receives gas direct from the high pressure source through a ¼-in. high pressure valve.

Procedures

The source of each routine gas sample (1) is equipped with the assembly made up of items (2), (3), and (4).

The inlet valve (12) of each sample container (11) is equipped with the male section of a Bear air hose coupling (5).

The joint of the coupling made up of items (4) and (5) and those made up of items (5) and (9) consist of male and female tapered seat members designed so that the necessary pressure for a leak-proof connection can be made by the hand operated nut (9) without the use of wrenches.

The procedure for purging the sample container and collecting the gas sample is as follows:

1. With the high pressure valve (3) and sample container outlet valve (13) completely closed, sample container inlet valve (12) open, the connection between Items (5) and (9) completed and all equipment otherwise assembled as shown in the attached sketch the gas sample container (11) is placed in such a position that the operator can observe the face of the pressure gauge (7) at all times during the operation of the high pressure needle valve (3) with one hand and the gas sample con-

tainer outlet valve (13) with the other.

NOTE: *Gas sample container inlet valve (12) must never be closed except as explained in the following instructions.*

2. While observing the rate of increase in gas pressure with the gas sample container (11), sampling tube (10), and the pressure relief assembly as indicated by pressure gauge (7), control the rate of flow of gas into the container (11) by adjusting the high pressure valve (3) to a point at which pressure gauge (7) will indicate a slow rise in pressure and come to rest with the opening of the pressure relief valves (8) at their set operating pressure or at a lower pressure, depending on the sample source pressure.

NOTE: In the event that pressure gauge (7) indicates a pressure 20 psig higher than that stamped on the body of the pressure relief assembly, the high pressure valve (3) must be closed immediately and the cause of the apparent excessive delivery pressure corrected.
If the relief assembly has been properly serviced and checked in the test shop before field use, it is very unlikely that it will be found defective in the field. However, in the interest of safety, the field tests outlined in Instruction 2 should be made as often as practicable and in the event that such tests indicate any unsafe condition of any part of the equipment its use should be immediately discontinued until it has been reconditioned and re-tested in the test shop.

3. Close valve (3) and completely open sample container outlet valve (13) and allow the pressure within the sample container (11) to decrease to zero as indicated by pressure gauge (7) and then close sample container outlet valve (13).

4. Repeat the procedure given in Instructions 1 to 3, inclusive, (except for the deviation from Instruction 2 explained below) to fill and empty the sample container the number of times given in the following table and thus complete the purging operation.

NOTE: In repeating the procedure given in Instruction 2, it is advisable to close the high pressure valve (3), as the pressure approaches the set operating pressure of the relief valves (8). This is because there should be no necessity for making more than one field check of the pressure relief valves (8) during the purging and sampling procedure.

Purging Pressure psig	Number of Times to Fill and Empty
130 & Over	3
80 to 130	4
55 to 80	5
40 to 55	6
32 to 40	7
26 to 32	8
22 to 26	9
19 to 22	10
17 to 19	11
15 to 17	12
14 to 15	13
13 to 14	14

5. To collect the gas sample, repeat the procedure given in Instructions 1 and 2 and then completely close high pressure valve (3).

6. Completely close gas sample tank inlet valve (12) and then release the pressure in sampling tube (10) by turning fitting (9) one-half turn.

7. Remove the sampling tube assembly by disconnecting fitting (9) from fitting (5) at each end of the tube.

8. Remove the pressure relief assembly from the outlet fitting (4) on the high pressure valve (3) by disconnecting fitting (4) from (5).

9. Inspect all gas sample container valves and fittings for gas leakage using the soap bubble test and make any necessary adjustments to eliminate gas leakage from the gas sample container.

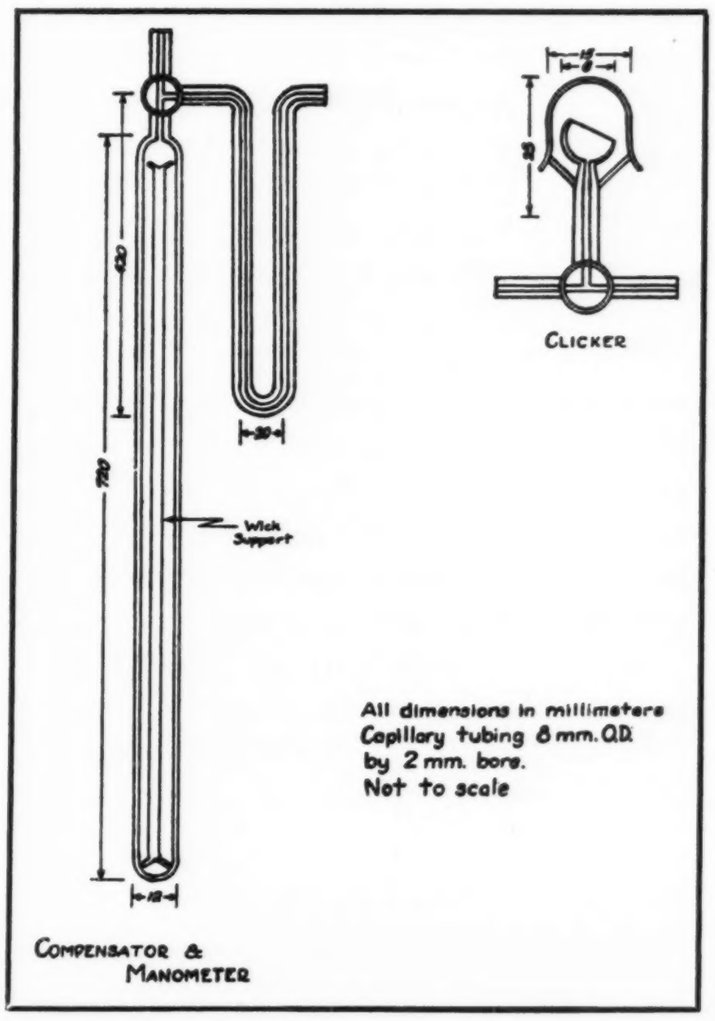
10. Enter on an identification tag all information that will insure the proper identification, routing, and testing of the particular gas sample.

11. Securely attach a shipping tag and the identification tag to the gas sample container, preferably within the valve protection ring where there is less probability of its becoming lost or damaged.

Precise Measurement of Gas Volumes in Gas Analysis

By R. W. SCHMIDT

Fig. 1. Drawing of clicker and compensator and manometer discussed by Mr. Schmidt.



SUCCESSIVE measurements of gas volumes during an analysis can be made with a glass diaphragm type compensator, originally designed and used by V. M. Zaikowsky of the Consolidated Engineering Corp., Pasadena, Calif. This compensator and method of measurement have the advantage of minimizing the possibility of mixing gases, together with an audible control of the pressure balance in the analyzer system.

In its present form, the compensator consists of a small glass ball flattened by heating one portion of it so as to give a wrinkled surface. This surface, under a pressure of a few millimeters, will click, and upon release of the pressure, will again click as it returns to its original setting. The action is the same as that of the stamped steel spring in a child's cricket. It has been our practice to form the clicker from capillary tubing by first drawing the tubing out to reduce it to approximately one-half its original bore and then blowing the small bubble on the end of this reduction. It

is not necessary that the bubble be greater than ¼-in. in diameter, but the wall must be sufficiently thin that on flattening and wrinkling a minimum pressure increase will produce a click. The several characteristics are:

1. Only one audible click in each pressure direction.

2. Small pressure increase.

3. Small pressure difference between up and down clicks.

4. Minimum volume of clicker bubble and stem (0.2 to 0.3 ml).

The clicker is connected to the gas analysis manifold by a three-way cock so that it may be bypassed for cleaning or purging purposes and when not in use may be left open to the atmosphere. The surface of the diaphragm is protected by a glass bell of slightly larger inside diameter than the bubble. This bell is fused to the clicker stem by small glass rods and, in addition to protection, it has served to slightly amplify the sound of the click.

The use of the clicker in the measurement of normal gas volumes, where its sensitivity is of the order of 1 to 2 mm, would result in errors ranging between 0.02% and 0.04% if the barometric pressure were to change 7% and no correction factor were introduced. A barometric change of this magnitude during the course of an analysis would be an extremely rare occurrence.

The introduction of a correction factor involves use of a standard compensator and manometer with one end open to the atmosphere. Utilizing this apparatus, volume corrections to the experimental limits of accuracy of the burette were possible. The compensator presently used is a tube containing a moist wick connected to one arm of the manometer by means of a three-way cock so that it may be either vented directly to the atmosphere or connected directly to the manometer. This manometer contains n-dibutyl phthalate and has a thermometer between the two arms. The thermometer serves a dual purpose in that it provides an accurate scale to measure the level of the liquid in the manometer and also gives the temperature of the water bath that surrounds the burette and compensator.

A correction factor is arrived at through the following procedure, which will also illustrate the use of the clicker and the method of utilizing the manometer-compensator arrangement:

A sample of gas of 90 to 95 ml. is drawn into the burette and the burette valve is closed. The mercury levels between the burette and reservoir are balanced and the burette is opened into the manifold. The previously closed clicker valve is opened to the manifold and clicker. The mercury level in the burette is raised until the clicker clicks. It is then lowered very slowly until a click is again heard. The cock at the bottom of the burette (which is used to control the mercury flow) is closed immediately, the clicker valve is closed, and the gas volume reading is taken. Then, immediately, the cock between the compensator and the manometer is opened to connect the two and isolate them from the atmosphere on that end. The level of the liquid in one leg of the manometer is noted as is the temperature of the bath.

The temperature of the bath is changed two or three degrees and allowed to become constant at that change. A corresponding change in the height of the liquid in the manometer arm will be noted. The mercury levels in the burette and reservoir are balanced and the clicker is again opened. A second volume reading is taken at the time of the down click, and the temperature and liquid level in the arm of the manometer are recorded. With these values, a correction factor per division of the manometer scale and per unit of volume of the burette may be calculated:

$$K = \frac{\Delta V}{(V_o - \Delta V)\ \Delta H}$$

Where:

K = Correction factor

V_o = Original volume

V = Change in volume

H = Change in liquid level in manometer arm

When not in use both the manometer and clicker should be left open to the atmosphere. This will avoid loss of the manometer fluid due to pressure changes in the compensator and will prevent possible damage to the clicker. The clicker now in use will stand pressure changes far greater than those encountered during the gas analysis process. Its resistance to fatigue appears to be excellent as its constant has remained unchanged for the past several years.

Pumping Samples of Combustion Products from Gas Appliances

By L. W. WEISS

THE pump shown in *Fig. 1* provides an easy method of collecting samples of combustion products in sample bags for analysis of carbon monoxide, carbon dioxide, oxygen, etc. At the gas appliance laboratory of the Southern California Gas Co. and the Southern Counties Gas Co., Los Angeles, prior to the development of this pump, combustion products were collected in sample bags by means of an aspirator bulb squeezed by hand. This method of filling sample bags with combustion products is satisfactory generally; however, it is quite tedious and fatiguing to the test engineer when he is required to obtain a number of such samples. To minimize the energy expended in doing this tedious job, which is routine in the testing of gas appliances, the pump shown in *Figs. 1* and *3*, for taking samples of combustion products from gas appliances was developed.

The pump assembly as illustrated is 6¾ in. wide by 19 in. long by 9½ in. high and weighs 13½ lbs. Air discharge capacity of the pump at various discharge pressures is shown in *Fig. 2*. While the maximum discharge pressure of the pump is approximately 50 in. water column, it is seldom necessary to exceed 15 in. water column pressure in filling sample bags. Since the pump delivers 14.2 cu ft per hour at 15 in. water column pressure, it is often desirable to adjust the rate controlling valve for lesser rates of flow when taking combustion samples.

The mechanism used for a pump in this unit is a gear pump, measuring 2½ in. high by 1½ in. wide by 2⅞ in. long. This gear pump is one that had been removed from an MSA carbon

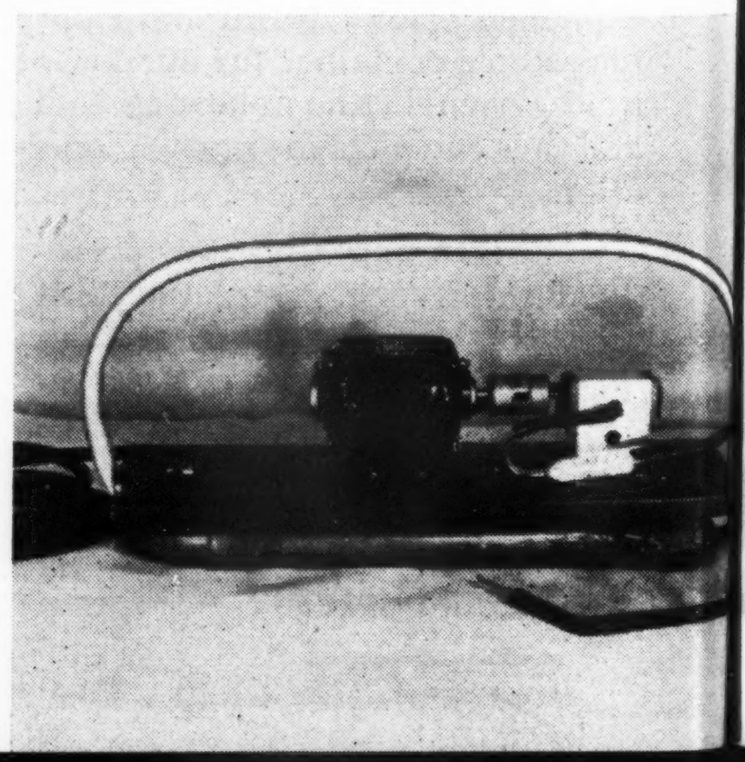


Fig. 1. Pump for collecting combustion product samples for analysis.

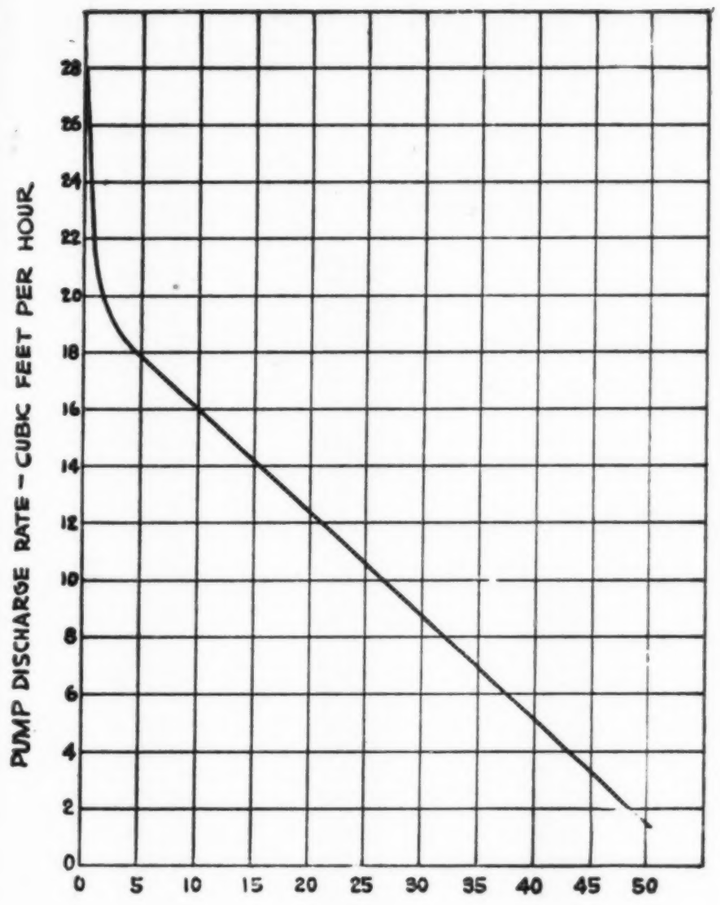


Fig. 2. Air discharge capacity of the pump at various discharge pressures.

monoxide indicator Model No. DS-43823 because it was worn to the point where it no longer performed its function as a vacuum pump; however, it performs adequately in the combustion products pump assembly. Discharge and intake connections to the pump are ⅛-in. IP size. A 110-volt, 60-cycle electric motor which has a rating of 1/25 horsepower at 5000 rmp is used to drive the pump. Connected to the intake of the gear pump is a "U" drying tube containing a drying agent (calcium chloride or activated alumina) for removal of the moisture from the combustion products before they enter the pump. When the unit was first assembled the "U" drying tube was not part of the assembly. However, when it was found that condensate in the combustion products caused the pump housing and gears to corrode, the drying "U" tube was added.

At the same time a small glass tube containing indicating gel (Drierite-anhydrous calcium sulfate) was placed in the suction line between the pump intake and the "U" drying tube. Thus, when the indicating gel begins to change color, the operator is visually warned that it is time to change the drying agent to protect the pump. The "U" drying tube made from 1½-in. OD copper tubing is 5 in. wide by 15⅝ in. long. The ends of the copper "U" tube are fitted with 1½-in. standard pipe couplings, which allow the ends of the "U" tube to be sealed with plugs which are drilled and tapped for ⅛-in. iron pipe size intake and discharge fittings.

The pump, motor, motor switch, and "U" drying tube are mounted on a ¾-in. plywood base measuring 6½ in. wide by 17 in. long. Attached to the base is a carrying handle which was fashioned from a piece of ⅝-in. OD aluminum tubing. All connections between the glass sampling tube, "U" drying tube, indicating tube, pump, and sampling bag are made with rubber tubing; thus it is easy to remove and service any part.

The component parts of the pump as shown in *Fig. 3* and listed in *Table 1*, may be purchased at a relatively small cost or it may be desirable to build an assembly similar to this from material now carried as stock in your laboratory. Although this pump is not the ultimate in design, it illustrates what can be done to minimize the energy expended by test engineers in routine test work.

TABLE I. MATERIAL USED IN ASSEMBLING COMBUSTION SAMPLE PUMP

Article	Description	Approximate Cost
Base	¾-in. plywood, 6½ in. wide by 17 in. long.	$00.40
Electric Motor	110-volt, 60-cycle, manufactured by Bodine Electric Co., Chicago. Motor rating 1/25 hp at 5000 rpm.	$15.00
Gear Pump	MSA Catalog No. DS-6971. This unit is the same as that used in the Mine Safety Appliance carbon monoxide indicators, Model Nos. DS-43823, DS-49141, and DS-9144.	$25.00
Flexible Coupling	For 5/16-in. shaft, manufactured by Ontru C. Bond Co.	$00.75
U Drying Tube	1½-in. OD copper tubing. Ends equipped with 1½-in. standard pipe couplings and two brass plugs drilled and tapped for ⅛-in. iron pipe fittings.	$03.00
Switch	110-volt, 5-amp, rotary. (ordinary lighting fixture switch).	$00.35
Needle Valve	Standard ⅛-in. gas appliance needle valve.	$00.55
Handle	Carrying 30-in. length of ⅝-in. OD aluminum tubing.	$00.20
Electric Leads	10 ft, No. 18, two-conductor rubber-covered wire.	$00.50

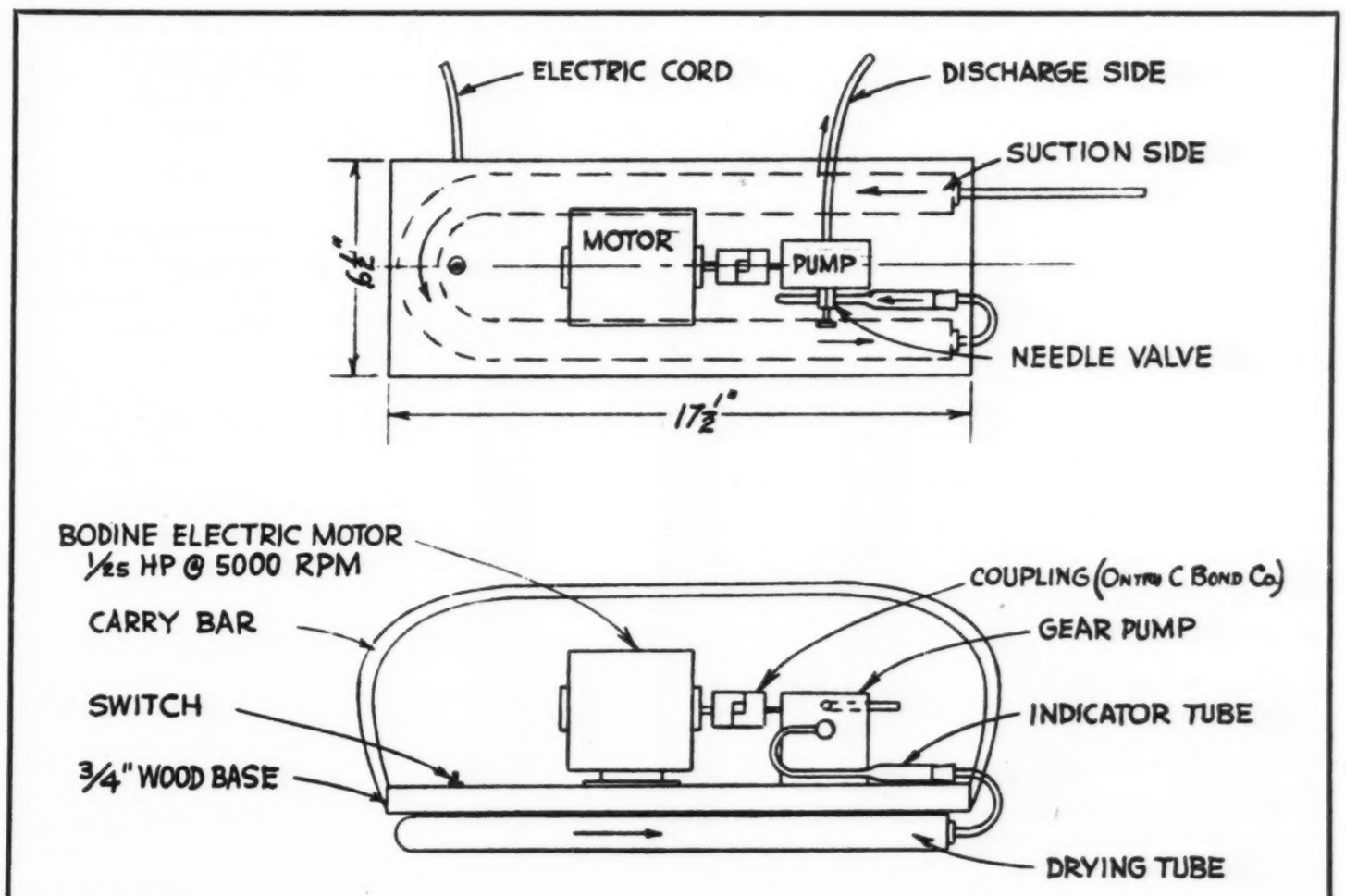


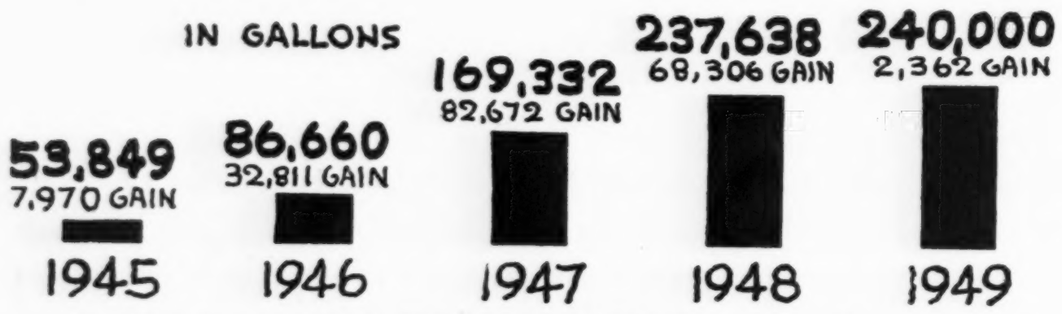
Fig. 3. Component parts for the pump designed for collection of samples of combustion products in sample bags, for analysis of carbon monoxide, carbon dioxide, oxygen, etc.

Natural Gas, Warm Weather Slow LP-Gas' Rapid Rise

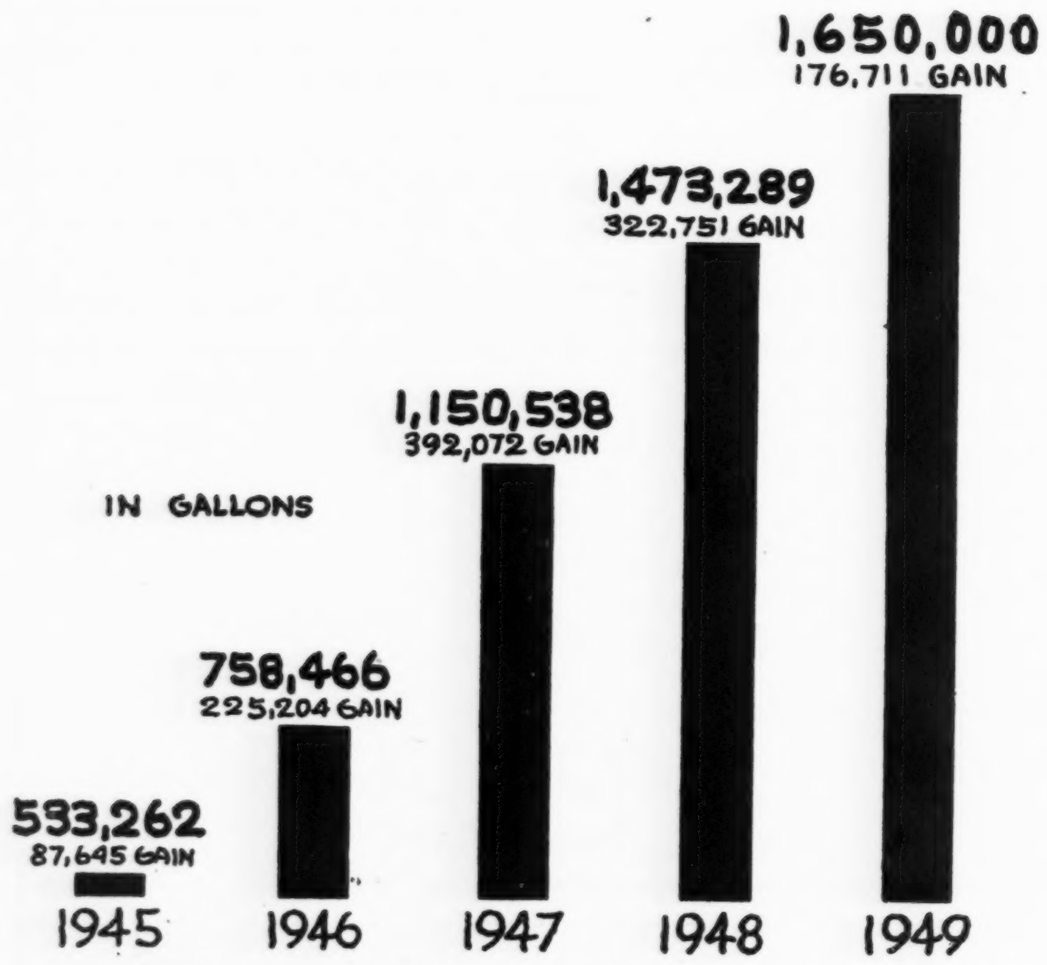
The accompanying graphs tell the LP-Gas sales story for the year 1949. They were prepared for GAS from a review of the year's sales activity by K. W. Rugh and E. O. Mattocks, both of Phillips Petroleum Co., Bartlesville, Okla.

LP-Gasmen are accustomed to annual sales increases that jump as much as 30%—but 1949 wasn't that good, largely because of the exceptionally warm winter of 1948-49, and because of the increasing availability of natural gas in rural areas which were heretofore beyond the mains. Some utilities that had been using butane and propane for standby supplies and for enriching of manufactured gas suddenly became users of natural, and no longer needed LP-Gas in big volume.

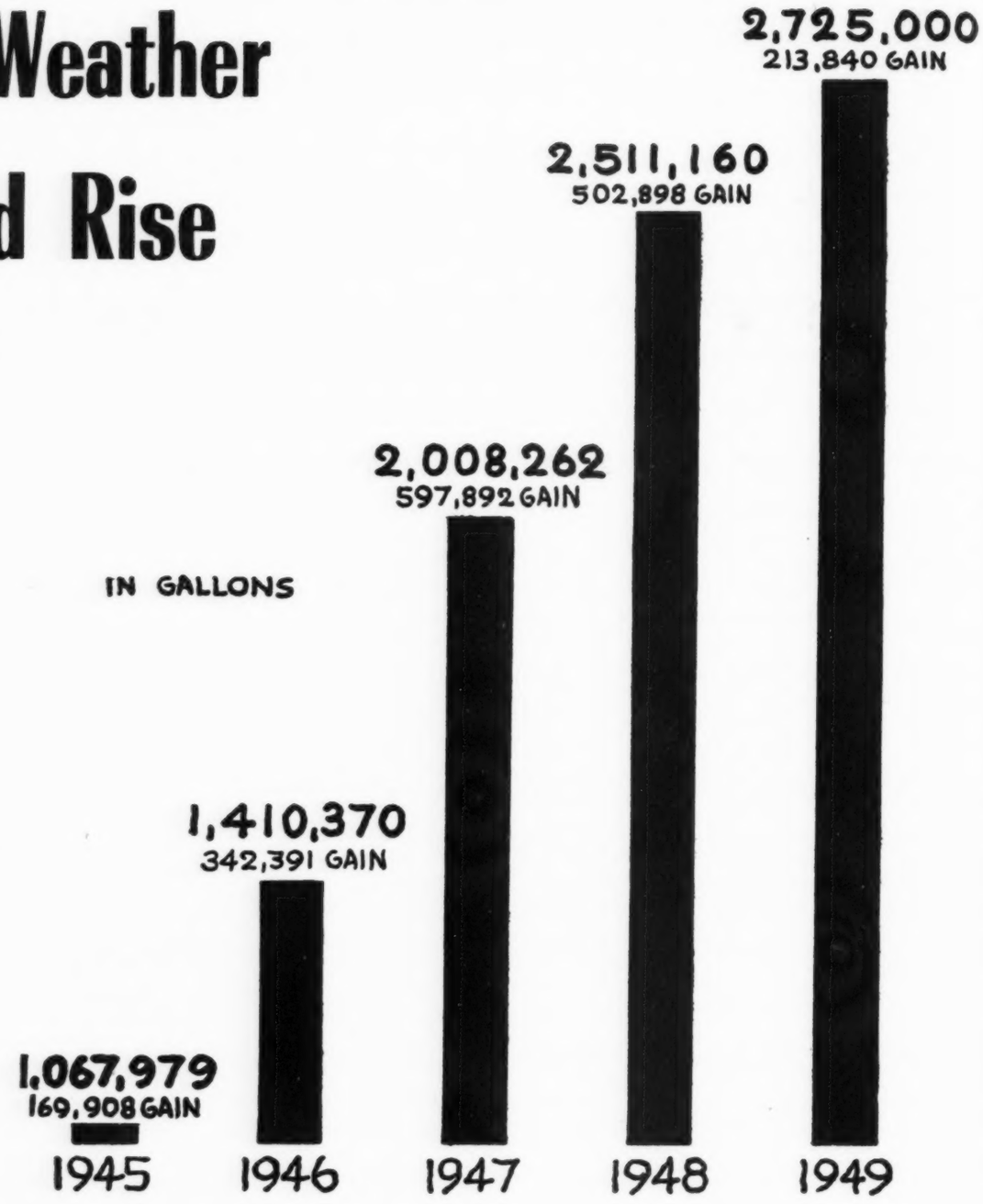
But the overall increase in sales of 8.5% (over 1948) does not portend a slowing down of LP-Gas' phenomenal growth, according to Mr. Mattocks and Mr. Rugh. Given normally cold winters and increased promotional efforts directed toward the industrial markets, they think LP-Gas will continue its rapid rise in usage.



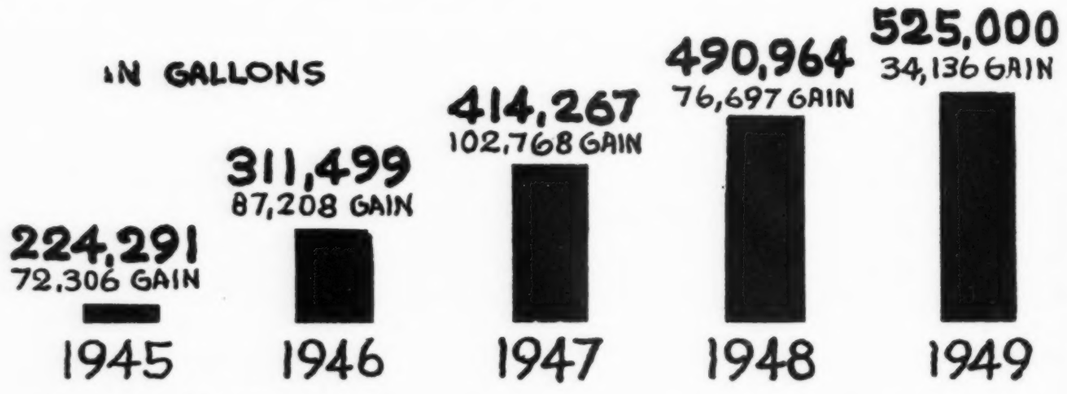
FOR GAS MANUFACTURING PURPOSES, 240 million gal. of LP-Gas were used in 1949. The increase over the previous year —only 1%—is again small because of the mild winter, LP-Gasmen say. They think this use of LP-Gas will grow with normally cold winters, and because gas companies are again taking new heating customers—which will necessitate larger LP-Gas standby plants.



DOMESTIC CONSUMPTION of LP-Gas jumped 12% over last year's totals with a 1949 figure of 1,650,000,000 gal. The mild winter of 1948-49 cut down space-heating use, but appliance sales held firm.



TOTAL LP-GAS sales in 1949 were 2,725,000—accounting for an 8.5% increase over the 1948 total. This increase, considerably off the phenomenal 25-30% increases of other recent years', was blamed by LP-Gasmen on mild winter of 1948-49, inroads of natural gas into former LP-Gas strongholds.



CHEMICAL USE of butane and propane as a raw material for the production of chemical intermediates continued during last year. Consumption was 525 million gal.—an increase of 6.9% over 1948.

INDUSTRIAL USE of LP-Gas increased only .3% in 1949 over 1948; 310 million gal. were consumed. Expansion of natural gas, followed by conversion to that fuel by many industrial plants (which in turn will require LP-Gas standby plants), and new methods of converting tractors, buses, etc. to LP-Gas, make possibilities of expansion of the industrial market for butane and propane much richer.

The Value of Product Meetings

Home service can help acquaint salesmen with product, boost sales potential

By KATHRYN A. HEFFERNEN

Home Service Director
Wisconsin Public Service Corp.
Green Bay

(Condensed from a paper presented at the AGA Home Service Workshop, Chicago, Jan. 4-6, 1950.)

A "product meeting" is a gathering of the local sales supervisor, salesmen, and home service advisor. Its primary purpose is to gain familiarity with the outstanding qualities of the products they sell as compared with similar products on the market. Another purpose is to enlarge their experiences in actually using the products that are to be sold.

A sales meeting, on the other hand, is a meeting where selling techniques are taught and learned.

In our offices, we have found it practical to hold product meetings every two weeks throughout the year. Representatives from range, water heater, clothes dryer, and refrigerator companies each spend the first hour of their allotted time discussing and explaining their appliances, while the second hour is open for general discussion and questions. This has proved very helpful as it acquaints everyone present with the construction and operation of each appliance. Questions and problems which have arisen on any products we sell are presented for discussion. With the aid of the factory representative and home service they analyze and settle these problems immediately. The same story is told the customer and conflicting statements do not occur.

The program for the study of appliances at these meetings is set up in the fall.

To be able to discuss appliances with a factory representative, learn how new models have been improved, and what new features have been added that will attract and aid the American homemaker is important. Since the housewife is the one who makes 90% of the purchases for the home we must make sure she understands and uses to the best advantage the appliances she purchases.

At these meetings the latest surface cookery and oven features of certain ranges may be discussed, or the radiant broiler demonstrated. The frozen food compartment of the Servel refrigerator may be demonstrated and a luncheon prepared with the foods stored there. A certain water heater may be featured in the discussion of the use of hot water service for dishwashers and laundry service. The clothes dryer may show the speed, convenience and comfort of drying clothes.

Home service enters the picture when demonstrations are presented or the women's angle on buying is needed. One example of a products demonstration is as follows:

Broiler Story. The salesmen are divided into small groups to prepare various broiler meals. Foods necessary for each menu are arranged on the tables with directions for preparation. Selections of meats, fish, vegetables for broiling, various types of broilers and placement of broiler pans are explained. They do the actual work that homemakers do in their own homes. The men place the foods in the ranges and follow through with their care while broiling. Foods are served with assistance from the home service personnel. After the meals are served and the men have the opportunity of eating their culinary accomplishments they realize how well fortified they are to talk to the housewife on the "Art of Broiling."

This can best be summed up in the statement, "It is our business to inform our salesmen about the products we sell." This is a business in which home service must provide the initiative. We must improvise with any tool of presentation, demonstration, and first class servicing. We must help expand the salesman's thoughts to keep up with our customers' requirements. We must provide him with the advantages of sales points and the know-how of these advantages through actual use, and help him talk the customers' language and promote better customer satisfaction.

Home Service in 1960

Educating buyer to pave way for sales seen as important job of future

By ROBERT E. GINNA

Vice President, Rochester (N.Y.)
Gas & Electric Corp.

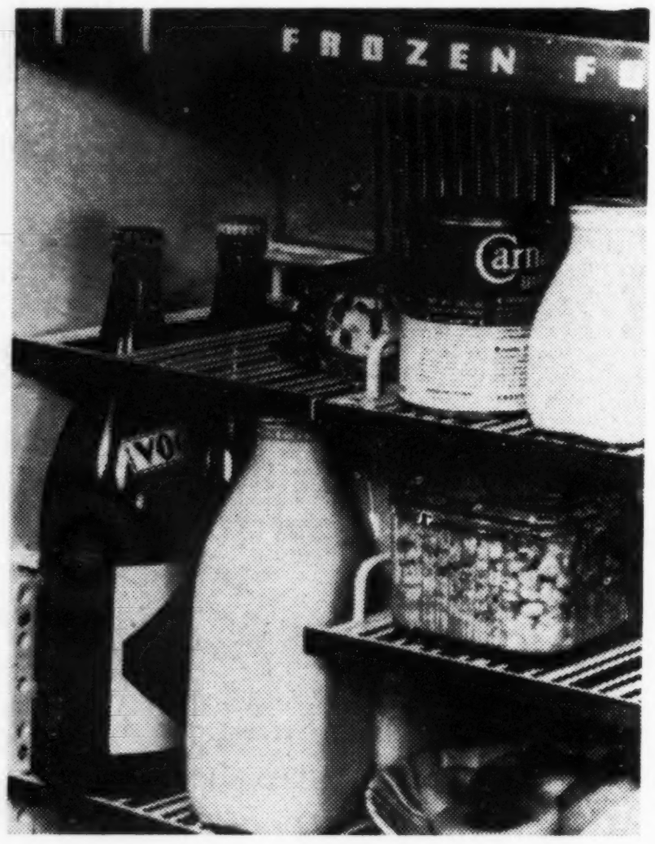
(Condensed from a paper presented at the AGA Home Service Workshop, Chicago, Jan. 4-6, 1950.)

THE future of the home service economist lies in being made a definite and integral part of the sales organization. As such, home service's most efficient and economical role is to educate the prospective buyer before he buys. Our appliance salesmen are too valuable to us, and costly to themselves, to spend time in training and educating prospects for major home appliances. Salesmen must be used to canvass prospects, to tie together all the loose ends and close the sale.

I am continually astounded at the prospective buyer's lack of knowledge about the up-to-dateness of our various home appliances and their many time- and money-saving features. Our customers just do not know enough about what is available to meet their needs. As a result our salesmen are doing too much spade work before reaching "pay dirt."

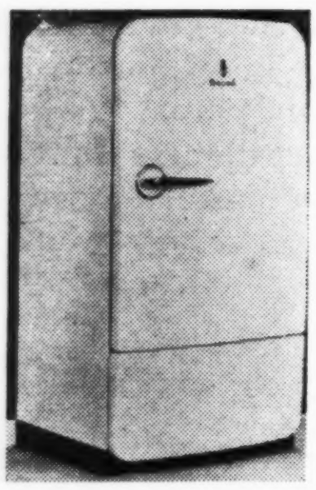
You rightly ask at this point, "Well, where does the home economist—the home service department—fit into this picture?" I can best answer this by referring to a recent release which so aptly tells the story that I am taking the liberty of copying and paraphrasing it. Please bear in mind that the analogies I am to make are of my own doing and

THE SWING SHELF, dropped into this position, provides over and above the regular tall bottle area space for storing four quart milk bottles, 12 baby nursing bottles, or other extra-tall containers.



ONE of the five adaptability features is the tall bottle cutout shelf, located above the tall bottle shelf to take care of those extra tall bottles for which space is sometimes needed.

Servel Takes Wraps Off 1950 Model



THE Servel refrigerator for 1950 emerged from its wraps last month, and with it came good news for consumer and seller alike.

Substantial price reductions, increased advertising budget, production schedule increases, large scale utility cooperation, and a large distributive organization increase made good listening for utility and dealer salesmen as they watched Servel lift the curtain on its lovely new models.

Just how much the decreases were to be was not announced as *GAS* went to press, but President W. Paul Jones promised that they would be substantial despite rising costs of steel and other basic commodities.

Ad budgets were up from 50 to 100%.

A minimum 50% boost in production was promised. But Mr. Jones pointed out that this estimate was "very modest—we fully expect in a very short space of time to raise 1950 production much higher."

The 50% or more sales increase the company is banking on hinges on customer acceptance of two major design changes—the restyled exterior created by Walter Dorwin Teague, outstanding industrial designer, and the much-heralded "quick-change" interior. Classic lines with exquisite detail were embodied in the shell of the new models to make them as attractive 10 years from today as they are now.

Inside, shelf space has been arranged to fit the shelf to the food, not the food to the shelf. Some ways in which this is achieved are demonstrated in the photos.

THE LIFT-OUT HALF SHELF was designed into the flexible interior of the Servel to accommodate occasional bulky items.

Simultaneously, Servel also announced a new complete line of air conditioning equipment for 1950. Great flexibility in systems is claimed for the line, which includes the complete air conditioner, an absorption cooling unit, to which may be added the steam generator heating unit, humidifying and dehumidifying element, fan filter unit, and control unit.

The absorption unit, occupying 11.25 sq ft of floor space, is designed for the small home, while large loads can be handled with multiple units.

not sponsored by the persons referred to herein.

The news item was headlined "Housewife Urged to Be An Engineer," and the item opens with the statement that

> "A little engineering on the part of the American woman could do wonders for her housework," said Dr. Lillian M. Gillbreth, noted engineer who is perhaps better known these days as the mother of the "Cheaper by the Dozen" family.

To put it all in a nutshell, isn't it true and doesn't it follow that the home economist, the home *engineer* economist, is the very consulting engineer, ready, willing and able to do the job as an essential part of the domestic sales organization of the utility?

Again quoting from the news item (and I, too, am of the same opinion):

> Although under no illusion that the engineer's approach solves the problems of raising a dozen children (or even half a dozen), white-haired Dr. Gillbreth is enthusiastic about "Engineering Management Techniques" for homemakers.

Again I chime in, "Who but our home service economist—our home service departments with their home engineers—are better qualified to do this job?"

Recently I was privileged to sit in at a round-table discussion with some very well known economists, and we were discussing the decade 1950 to 1960 and what business conditions might be then and what risks of investment were justified. There seemed to be general agreement that there would be no serious depression; that for one reason or another we were rapidly becoming a nation of middle class families; that the domestic servant was no more and that, more and more, automatic and labor-saving equipment would become an essential part of our American homes; that to utility managements this meant an ever-increasing demand for complete utility services, and therefore large investments in utility plant expansions were sound and would attract investors.

I believe there are economic factors and forces that justify such a favorable outlook. On the other hand, reverting to my interest in and knowledge of sales, and realizing the job ahead, I had many questions of doubt that the future was quite so rosy. For example, I pointed out that if every home were going to be amply and properly equipped with appliances, somewhere in the process much home engineering educational work had to be done.

"Educate whom?" they said.

"Why, the woman of the house," I replied, "and the man, too."

It has been my observation over many years that there is no consistent mass organized effort to acquaint the utility customers with the current changes and improvements in major home appliances. Certainly, we go to

great lengths to educate *ourselves* about new appliance developments. But in my humble judgment these efforts are not enough to accomplish what I have in mind for home economists.

As you folks must all realize, a successful sales effort must be continuous, dynamic and everlastingly full of hard selling. The sales job can be made much easier for a merchandising operation if the potential buyers are saturated with knowledge ahead of the time when the appliance salesman comes around to ring the door bell. Who can do this advance educational work better than you?

There is one fundamental step required to re-style the home economist for 1960. First it must be recognized that she is an integral and valuable part of the sales effort. This means she should work jointly with salesmen, advertising people, appliance servicemen, and appliance testers and researchers. She will be required to add to her basic training in know-how about cooking, nutrition, foods, laundry, etc., a special knowledge of equipment, its operation and performance standards.

Many times customers start right out "behind the eight-ball" because they do not know the *how* of proper temperature control and flow, and the *why* of old style pans and utensils impeding proper heat transfer—and even heat distribution, in a new appliance. There is no substitute for using good tools properly. Too many of our customers do not know how much they waste with old and inferior appliances.

Instead of too many cooking schools and single demonstrations, plan to set up comparative demonstrations—a sort of "before" and "after"—which will show the *whys* and *hows* of new appliances as compared to the 10-to-20-year-old ones still in use.

Removing Organic Sulphur Compounds

An appraisal of existing catalytic processes for the purification of coal gas

By J. H. G. PLANT and W. B. S. NEWLING

The Gas Light & Coke Co., London

(Condensed from Copyright Publication No. 344/157 of The Institution of Gas Engineers, London.)

The main features of existing catalytic processes are discussed below:

The South Metropolitan Co.'s process. The catalyst was prepared by reducing nickel chloride, deposited on porous fireclay and was shown by Stanier and Evans[1] to consist of nickel subsulfide. The catalyst operated at 420° to 440°C and had to be regenerated after working for 30 or 35 days, owing to the deposition of carbon. The gas was raised to the working temperature in a preheater fired by coke, and the organic sulphur compounds were largely converted to H_2S.

The Gas Light & Coke Co.'s process. The catalyst is prepared by the reduction of nickel sulphate deposited on china clay, and again consists of Ni_3S_2. It operates at an inlet temperature of about 230°C, which rises to about 360° C in the catalyst zone owing to the combination of hydrogen and oxygen taking place. Regeneration is necessary after 90 to 120 days. The inlet gas is preheated by heat exchange with treated gas. The organic sulphur compounds are mainly converted into sulphur oxides, although small amounts of H_2S are also produced.

The Holmes-Maxted process. The Holmes-Maxted catalysts are described as metallic thiomolybdates, chiefly those of copper or nickel, on a bauxite carrier. They operate at a maximum temperature of about 385°C. Spent catalyst is removed in a semi-continuous manner, so that the average time of the catalyst at work is 24 days. Preheat is provided partly by external firing and partly by heat exchange. The sulphur appears in the form of H_2S.

The final assessment of the value of any catalytic process will depend on (1) its cost, (2) its efficiency and (3) simplicity of operation and control. Development of the Gas Light & Coke Co.'s process during the past 10 years has had as its objective the attainment of the best conditions in these three directions. The work has involved (a) a study of the structure and preparation of the catalysts, (b) determination of the reactions undergone by each of the sulphur compounds, with particular reference to the behavior of thiophen, (c) consideration of the thermal characteristics of the process, and (d) improvements in the design of plant.

Summary

All processes which depend on catalytic decomposition for the removal of organic sulphur compounds from coal gas require the preheating of the ingoing gas and the maintenance of the catalyst at some predetermined operating temperature. The necessary heat can be supplied either externally by an indirect preheater, or internally by the reaction of oxygen in the gas with hydrogen.

The internal system is fundamentally more economical and has been operated for 10 years with purified unstripped coal gas from horizontal retorts on a scale of 1.5 MMcf per day at the Harrow works of The Gas Light & Coke Co. The experience gained from this plant and from experimental work in the laboratory has led to the following conclusions:

1. The practical limit to which the organic sulphur compounds other than thiophen can be reduced in coal gas is still about 3 gr per 100 cu ft. The heat consumption can be less than 1% of the heating value of the gas. The total cost is about 0.2d. to 0.25d. per therm, provided the load factor is good.
2. Although thiophen can be catalytically destroyed in pure hydrogen, it is most unlikely that its continuous decomposition in coal gas will ever be practicable. This is because the catalysts are rapidly poisoned for the reaction by other substances in the coal gas, particularly cyclopentadiene.
3. The most suitable industrial catalyst for the sulphur-removal process still appears to be nickel subsulphide on a china-clay support. Its advantages lie in its cheapness, simplicity of manufacture, resistance to fouling under selected operating conditions, and in its activity for the essential oxygen/hydrogen reaction.
4. The economic operation of the process depends primarily on low heat consumption, low maintenance charges, and low labor requirements. The latter are largely associated with the frequency of catalyst regeneration. The rate of deposition of fouling material increases with the catalyst temperature, but the inert porous coke formed about 350°C is much less harmful, particularly to the oxygen/hydrogen reaction, than is the more gummy material produced at lower temperatures. These considerations restrict the optimum working range of the catalyst to about 330° to 380°C. If it is convenient to work the process on stripped gas, somewhat longer catalyst life and lower working costs may be expected.
5. The temperature of the catalyst is not the principal factor in determining heat economy. The heat consumption depends only on the sensible heat of the outgoing treated gas and on the surface losses from the plant. These two quantities are respectively functions of the area of heat-exchange surface provided for a given rate of gas flow and of the efficiency of the thermal insulation rather than of the catalyst temperature.
6. Uniform gas distribution across the catalyst

[1]Proceedings Royal Society, 1924, 105(A), 626.

bed is esential for the proper performance of the oxygen/hydrogen reaction. For this reason and to provide easy and localized discharge and replacement of exhausted catalyst, a vessel for horizontal gas flow has been developed. Improvements in the design of gas-to-gas heat exchangers have been projected and a compact arrangement of catalyst vessel and heat recovery system worked out.

Finance and Expansion

Newly orphaned operating companies must learn the arts of financing

By JOHN C. DOERFER

Chairman, Public Service Commission of Wisconsin

(Condensed from a paper presented at the Wisconsin Utilities Assn. convention, gas and electric sections, Milwaukee, Nov. 22.)

THE problem of expansion brings with it the problem of financing such additional facilities. Since the "holding company death act," passed some time ago by Congress, is presently taking effect, more and more of the operating companies are being placed upon their own. They are now required to learn the art of financing and to obtain the expert services in this field which were formerly furnished by the holding companies. With respect to financing, there is a good deal to be learned.

Recently I attended a conference in the city of New York which was designed to educate the operating executives and explore the new problems presented to the operating companies in the field of financing their own requirements. How and why the investor places or fails to invest his money in the public utility field was carefully discussed. Officials of the operating companies made their first acquaintance with the security analysts, the rating experts, the institutional buyers such as the large insurance companies, the investment trust buyers, the investment bankers, and the commercial bankers. All of these specialists summarized and submitted their functions and their conclusions. Very few large investors or dealers in securities who undertake to advise the investing public do so without consulting or engaging the services of one or more of these expert analysts.

* * *

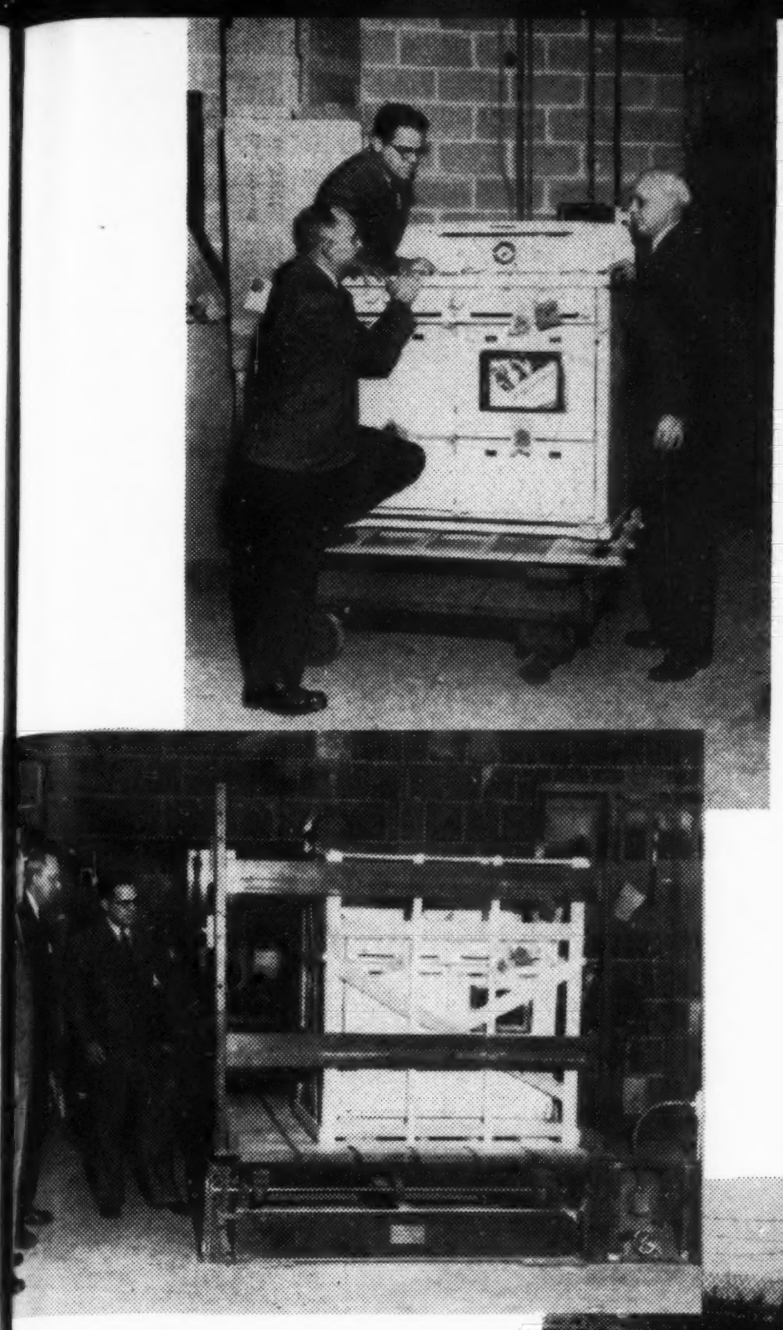
Although a utility may be said to have a monopoly within the field in which it operates, its exclusiveness is confined merely to the identical service which another proposes to offer. Actually it has a good deal of competition. Witness the competitive forces constantly at work in the field of transportation between the trucks and the railroads and in the field of servicing home appliances, between the gas and the electric utilities.

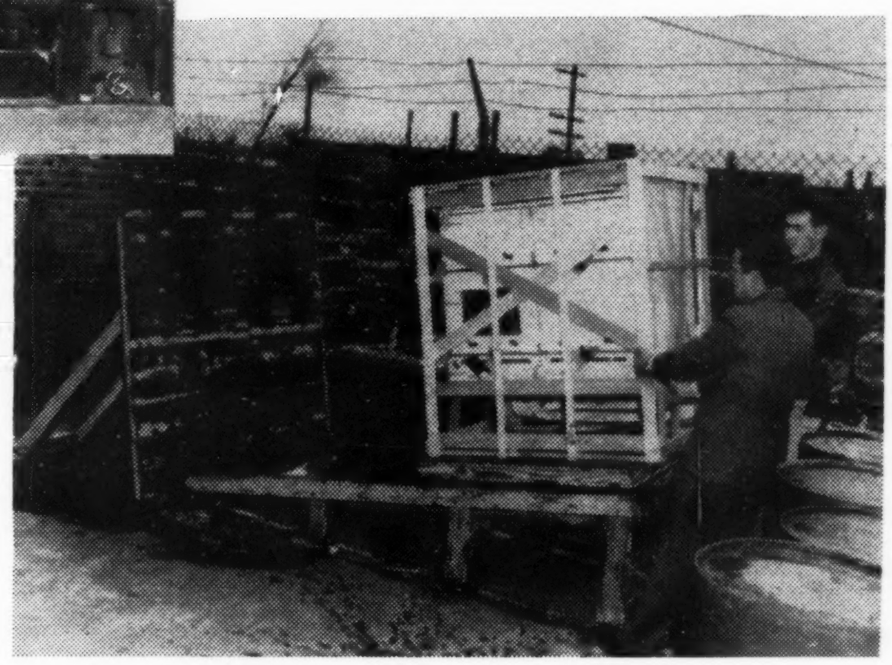
Hence many of the margins of profit which are to be realized by the respective utilities must be found within the confines of a competitive field for customers and the efficient operation of its plant. To be sure the regulatory bodies are bound to be called for authorized rate increases, but they cannot supply the deficiencies which are beyond their control. It is altogether too easy for certain utilities to excuse their poor showings by throwing the blame upon the regulatory commissions, when actually poor judgment of markets or market possibilities, operating inefficiencies, and costly financing programs, as well as almost a total oblivion to the art of bettering their public relations has been the real cause of their difficulties . . .

Operating companies just freshly cut loose from their holding companies will encounter some difficulty in solving their expert technical service requirements. A careful analysis should be made of how best to acquire these services. A proper setup will avoid the charge that the experts in representing one utility have a conflict of interest in representing another utility which belongs to the same family. Admittedly, the pooling of experts in one organization and the drawing upon their services by the individual operating companies as and when needed is more economical than establishing departments within each company which may not be used to the fullest extent at all times, but which, nonetheless, would draw full-time compensation. Such service organizations and contracts will have little difficulty in meeting the approval of regulatory bodies if they are absolutely free from any possible charge of experts attempting to serve two masters at the same time to the ultimate detriment of one of the affiliated companies. I am satisfied that efficient and economical organizations and fair contracts can be worked out. It remains for the utilities to see to it, that like Caesar's wife, such organizations be beyond reproach.

"Ride the Gas Line—Faster, Modern," reads the legend on the engineer's coats worn by H. Carl Wolf, AGA Managing Director (left), and H. Leigh Whitelaw, GAMA chief. The gasmen are emphasizing the "all-aboard" theme for the 1950 Court of Flame water heater promotion, which gets under way March 1. Unlike the 1949 campaign, the 1950 model will give every salesman a chance to win a prize, the value of which will be determined by the amount of his sales.

Roper's In-Transit Testing Treats Ranges Rough





TESTING Roper ranges on all six exposed sides is undertaken on device at right. ABOVE, Roper engineering coordinator M. A. Ritchie explains package tester to L. E. Richmond and H. A. Schmitt, Illinois Central railroad. AT TOP, Walter Zwiger, Mr. Ritchie, and E. H. Shands give range a final check.

EVER since the war, one of the principal subjects of gas appliance dealers' gripes has been the poor condition of appliances received from the factory. This fact was substantiated in a survey made by Jenkins Publications last year, and reported in *GAS* (April 1949, p. 26.)

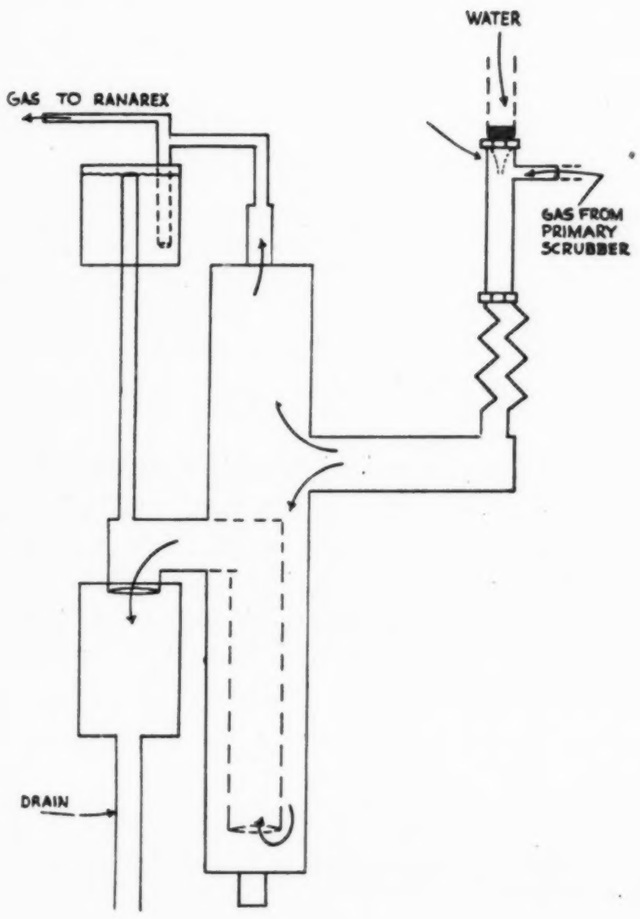
Now comes the Geo. D. Roper Corp., Rockford, Ill., with a method of packaging and testing designed to eliminate such complaints. The organization of a three-phase program—package and crate designing and testing, product design and testing, and cooperation with railroad officials to improve in-transit handling—has qualified Roper for a certificate from the Porcelain Enamel Institute's national safe transit committee. This entitles the company to place an official sticker on each crated gas range, announcing that the company has complied with testing qualifications and imploring handlers to "make safe handling your job!"

Under the supervision of E. H. Shands, Roper's director of research and development and chairman of the national safe transit committee, the company has set up tests to simulate railroad handling. Included are the package tester, a device consisting of a heavy platform mounted on an agitator which imparts a roll-and-pitch motion; incline tester, measuring the relationship of impact to car speed; and the "fifth zone" test, which applies gravity force.

Product design has also been modified to the extent of changing mounting arrangements to prevent damage that would not be cured by good crating alone.

Meetings with railroad men have contributed to the program in providing better in-transit handling.

Portland Instrument Men Design Nozzle That Minimizes 'Tar Fog'



AN ingenious redesigning of pump nozzles to minimize "tar fog" in sample gas pumped to instruments on Portland Gas & Coke Co.'s 14 oil-gas generators has earned a $500 suggestion award for two company instrument men, Harry Quin and C. V. Jackson.

The award was the largest ever made under the company's established suggestion plan which centers around monthly meetings of a committee composed of heads of the various departments.

The tar fog referred to in the Quin-Jackson suggestion formerly condensed around the nozzle and the gas inlet pipe, plugging the pumps and necessitating frequent cleaning and calibration of the instruments—all of it adding up to about a full-time job.

The redesigned nozzle, the two instrument men found, produced a vacuum equalling or surpassing that of the original nozzle and does a better job of removing the troublesome tar fog and other impurities.

The pump modification practically eliminated the need for cleaning the pumps—they now require only steaming. Cleaning the instruments is necessary now only every 60 days or so, compared with nearly every week.

Also, the necessity for calibrating the instruments has been reduced from twice a day to twice a week; even then they require but a very slight correction, if any at all.

In addition to time previously consumed in keeping the pumps clean and in operation, the frequent taking apart resulted in stripping the threads, thereby greatly shortening the life of the pumps.

Quin and Jackson did not submit their suggestion until they had observed their experimental modified pump in actual service for more than 75 days with the described results.

AT LEFT: Prizewinning pump nozzle design. AT RIGHT: Prizewinning designers, Harry Quin (left) and C. V. Jackson.

ASSOCIATIONS

Role of Home Service

Importance increasing, theme of workshop

THE role of the home service department in the gas industry future was the big subject in Chicago Jan. 4-6, when 270 representatives from 33 states and Canada took part in the AGA-sponsored Home Service Workshop.

The workshop, an annual event, was this year chairmanned by Irene Muntz, home service director of the Rochester (N.Y.) Gas & Electric Corp. She introduced the first feature of the workshop; a symposium on special programs now underway and proving successful in nine companies—"how to do it" examples for home service department operation. Participants in this program included Elyse Van Dyke, Alabama Gas Corp. (Birmingham); Kathryn A. Heffernen, Wisconsin Public Service Corp. (Green Bay); Anne L. Goff, The Gas Service Co. (Miami, Okla.); Mary N. Hall, Elizabethtown Consolidated Gas Co. (Elizabeth, N.J.); Ruth D. Kruger, Central Arizona Power & Light Co. (Phoenix); Susan A. Mack, Boston Consolidated Gas Co.; Harriet Pruitt, Lone Star Gas Co. (Dallas); Eleanor Marvin, The Manufacturers Light & Heat Co. (Steubenville, Ohio); and Isabel McGovern, Minneapolis Gas Co.

R. E. Ginna, vice president, Rochester Gas & Electric Corp., addressed workship delegates at a luncheon on the first day of the sessions, treating the subject "A Home Economist—1960 Style." His remarks pointed up a definite need in utility sales campaigns: "... the future of the home economist in the (gas) industry . . . is in becoming an integral part of the sales force . . . with education of the prospective buyer as its most important function . . ."

Jessie McQueen, AGA home service counsellor, described the association's home service activities in a talk titled "Sponsored by AGA." Other speakers included W. J. Schmidt, general sales manager, Long Island Lighting Co., who discussed the importance to the industry of an increased water heater load; Dr. Elaine Knowles Weaver, associate professor of home economics, Ohio State university, whose subject was research in laundering; H. Vinton Potter, AGA promotion coordinator, who spoke of the various AGA campaigns to follow during the year (Clean-Up, Size 'em Up, etc.); and C. S. Stackpole, vice president of Airtemp division, Chrysler Corp., whose topic was the need for enthusiastic evaluation of the industry and of home service work by each person engaged in it.

"Portraits in Cooking," a demonstration of CP gas ranges, was given by Lucy Slagle and Marion Chestnut of Atlanta Gas Light Co. A similar demonstration, of the new Servel refrigerator, was presented to workshop attendants by Elizabeth Lynahan, Peoples Gas Light & Coke Co. (Chicago). Good and bad methods of dealer-floor demonstration were studied by the group in a skit presented by Jane Schleicher (supervisor), Betty Dolinar, Dorothy Dean, Jeanne Loran, and Virginia Mitchell, all of East Ohio Gas Co.

The home call — an important part of home service work — was discussed by Mrs. Ellen Bridges, The Gas Service Co., Pittsburg, Kan., and methods of increasing departmental efficiency were studied by Mary Huck, The Ohio Fuel Gas Co. Twenty methods of preparing the home demonstration were presented by Catherine Haigler, Brooklyn Union Gas Co.—and home service testing of new appliances and equipment was recommended in a talk by Mrs. Mary Belle Burnett, Cincinnati Gas & Electric Co. Other important talks were given by Eleanor Morrison, Michigan Consolidated Gas Co., and Mrs. Mary Louise Bohn, Laclede Gas Co. (St. Louis).

WORKSHOP SYMPOSIUM SPEAKERS (above): Isabel McGovern, Minneapolis; Susan Mack, Boston; Ruth Kruger, Phoenix; Harriet Pruitt, Dallas; Anne Goff, Miami, Okla.; Kathryn Heffernen, Green Bay, Wis.; Eleanor Marvin, Steubenville, Ohio.

DISCUSSION LEADERS (bottom): Eleanor Wiese, Newark, N. J.; M. Thelma Bly, Lincoln, Neb.; Dorothy O'Meara, Bridgeport, Conn.; Vivian Marshall, New Orleans; Fay Rudolph, Evansville, Ind.; Vera Carter Ault, Denver; Florence Neely, Baltimore; Lois Wilson, Moline, Ill.; Flora Dowler, Pittsburgh, Pa.; Ruth Sheldon, Washington, D. C.; Dorothy Buck, Mansfield, Ohio.

New AGA Requirements And Addenda Distributed

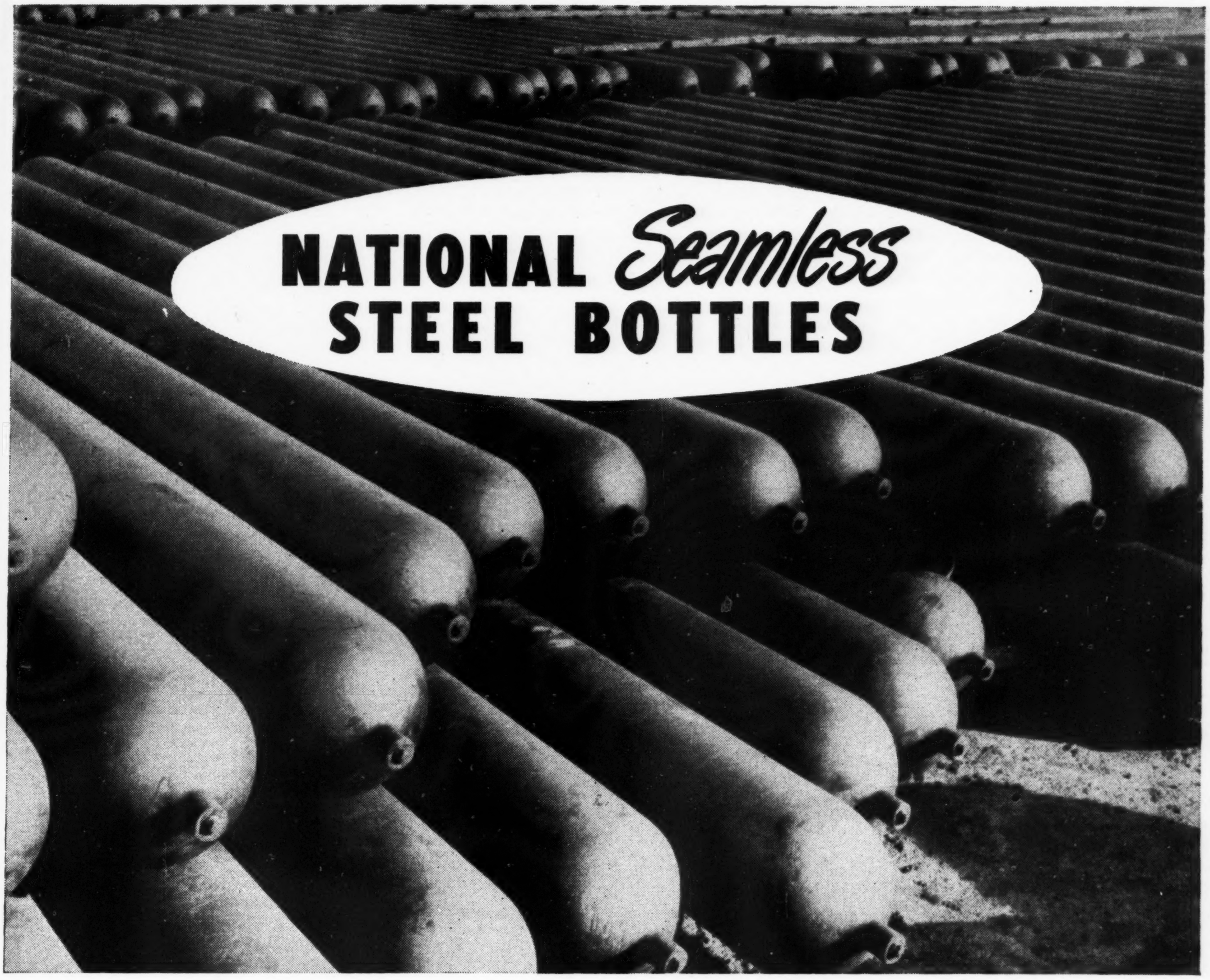
New requirements for water heaters, room heaters, incinerators and gas hose for portable appliances, effective Jan. 1, have been distributed by the AGA Laboratories. Effective on the same date were new addenda to requirements for ranges, central heating appliances, hot plates and laundry stoves, and gas valves.

The room heater and gas hose texts formerly were known as those for space heaters and flexible gas tubing. Recessed heaters, formerly covered under the space heater requirements, are now covered in the new addenda to central heating requirements.

Water heater and room heater standards are revised and brought up to date in the new edition. The new incinerator text represents a complete revision of the old requirements which were formulated before the development of the incinerator in its modern form.

The gas range addenda provide for the approval of models with single point ignition. They clarify wash boiler combustion test procedures which also apply to hot plates and laundry stoves. The gas valve addenda present recommended dimensional specifications for range top burner valves, a step toward standardization and interchangeability.

New requirements covering approval of central heating appliances for installation at reduced clearances are well advanced and are expected soon to be in readiness for adoption. Proposed standards now being circulated for industry criticism include necessary revisions to establish two types of water heater requirements. It is proposed to make 160° delivery temperature the dividing line and employ separate requirements for water heaters delivering hot water above this figure.



For safer, lower-cost, high-pressure gas storage

● Here you see a view of some of the 900 National Seamless Steel Bottles ready for underground installation by a large western utility.

These 900 bottles will hold 22½ *million* cubic feet of gas at 2240 p.s.i. Buried underground, they are protected from airplanes, storm damage, atmospheric conditions.

National Seamless Steel Bottles simplify maintenance, too. Since storage is in many units, any bottle can be removed from the line for inspection without appreciably affecting the storage capacity. With the same ease, additional units for extra capacity can be added at any time.

The construction of National Steel Bottles assures the utmost in safety, performance, and longtime service. That's because they're made entirely from *seamless* steel pipe, that contains no welds. The ends are formed as an integral part by forging, and drilled and tapped to your specifications. All bottles are subjected to rigid inspection and tests — including a high pressure hydrostatic test on *every* bottle shipped.

For additional information on this *safe, low maintenance* storage system, write to the National Tube Company, Frick Building, Pittsburgh 19, Pa. and ask for National Bulletin No. 25.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.

COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

WALLS WITHOUT WELDS

UNITED STATES STEEL

Institute's Home Study Courses Nearing Completion

The three home study courses—on natural gas, manufactured gas, and distribution and utilization—will soon be ready for presentation to the advisory committee, according to E. S. Pettyjohn, director of the Institute of Gas Technology, Chicago, which is preparing the courses under AGA aegis.

When preparation is complete, the newly appointed advisory committee, consisting of presidents and vice presidents of many leading gas utilities, will review the texts with an eye to content as well as general policy.

The natural gas course, encompassing gas company organization, physical and chemical properties of natural gas, reserves, production techniques, transmission and storage operations, and marketing, is now ready for review. Availability for general use is expected by June.

The distribution and utilization curriculum will include features of distribution systems, boosters, regulators, meters, corrosion, and underground maintenance; and fundamentals of combustion, gas burners and combustion systems, applications, and interchangibility. This text is expected to be ready for review next autumn, with publication in mid-1951.

The manufactured gas course will discuss company organization, properties of gases, manufacturing processes, etc. It may be ready for distribution by the end of the year.

Reeves Heads Officers In Oklahoma Utilities Group

D. W. Reeves of the Oklahoma Natural Gas Co., Tulsa, is serving the Oklahoma Utilities Assn. as 1950 president, as a result of action taken recently by the association's board of directors.

D. W. Reeves

Others who will serve with Mr. Reeves include: C. N. Robinson, Public Service Co. of Oklahoma, Tulsa, first vice president; Richard W. Camp, Consolidated Gas Corp., Tulsa, second vice president; H. H. Ferrin, Oklahoma Gas & Electric Co., Oklahoma City, treasurer; Miss Kate A. Niblack, Oklahoma City, secretary .

Directors (3-year term) L. A. Farmer, president, Northern Oklahoma Gas Co., Ponca City; C. B. Day, general manager, Consolidated Gas Utilities Corp., Oklahoma City.

Directors (1-year term) Malcolm Morrison, Oklahoma Gas & Electric Co.; D. J. Tuepker, Public Service Co. of Oklahoma; A. F. Potter, The Gas Service Co., Bartlesville; D. W. Reeves; W. R. Thomas, Southwest Natural Gas Co., Ada, and W. L. Woodward, Alva.

Directors (holdover) R. L. Lane, Public Service Co. of Oklahoma; E. C. Joullian, Westoc Oil & Gas Co., Oklahoma City; D. S. Kennedy, president, Oklahoma Gas & Electric Co., and J. Y. Wheeler, Ardmore.

Miss Kate Niblack, secretary, announces that the 1950 convention of the association will be held at the Biltmore hotel, Oklahoma City, May 4 and 5.

NEGA Pioneers With New Membership Directory

What appears to be the most comprehensive association membership directory ever published has recently been distributed by the New England Gas Assn.

Including within its covers extensive data on each gas company and manufacturer company member of the association, the publication pioneers a new technique for works of its kind. An extensive keying system is used which streamlines and simplifies the presentation of company data. A carefully worked-out format facilitates location of desired data.

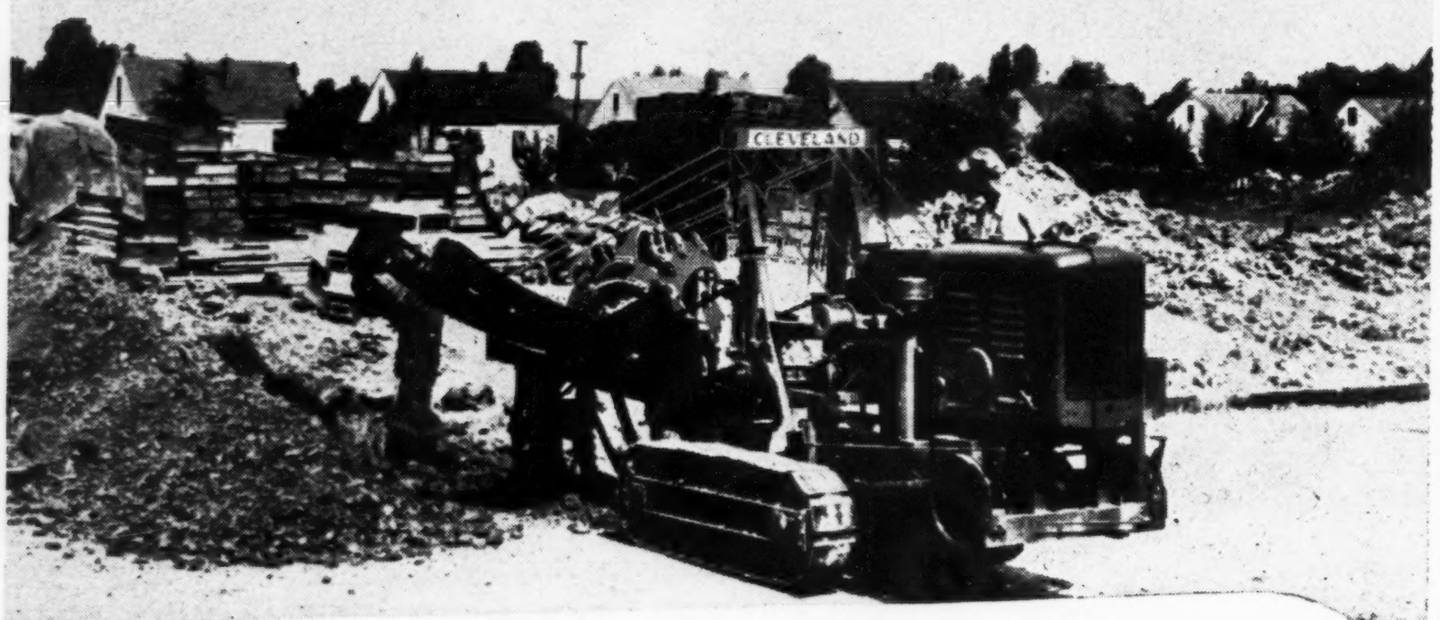
Included in facts about each utility company are complete company names and addresses, including various departments; executives and department heads—even home telephone numbers are listed for top executives; company operating statistics, including number of employees, gas meters, sales, Btu content and specific gravity of gas served, and system and group affiliation; names and classifications of individual members, listed by company.

Manufacturer member data include address; executives and representatives; carefully catalogued equipment or appliances or services sold; and lists of individual members by companies.

MODEL 92

THE CLEVELAND BABY DIGGER

Teamed with the T-5 TRAILER



GIVES YOU THE TWO TRENCHING ESSENTIALS— FULL-CRAWLER ON-THE-JOB MANEUVERABILITY and FAST, SAFE JOB-TO-JOB MOBILITY

Small, compact, sturdy and fast, the New Model "92" delivers the ultimate in performance on your city and suburban gas trenching jobs. Digging to a full 5' depth and a width of 10" to 20", it is ideal for house services or main line work within its capacities. Smooth clog-proof anti-friction-bearing-mounted full crawlers give you hairline maneuverability on the job. Safe, quick loading and unloading on its low-bed tilt-body rubber-tired T-5 Trailer give fast truck speed job-to-job mobility. See your local CLEVELAND distributor for specifications.

THE CLEVELAND TRENCHER CO. 20100 ST. CLAIR AVENUE CLEVELAND 17, OHIO

MEMO TO THE GAS RANGE MANUFACTURER

Growth and development of the Gas Range Industry has inspired comparable growth and development in Detroit Brass service to you.

The long-standing reputation of Detroit Brass for "quality-only" products is maintained in our ever-widening contribution to a great industry.

The recognition of the quality and service policy of Detroit Brass is attested to by the number of distinguished customers who for years have depended on this company as their main source of supply.

Added to this are the expanded Detroit Brass facilities for the development and proving of special items and unusual requirements—always available to you.

We solicit the opportunity to work with you.

VALVES FOR ALL GAS APPLIANCES

Pennsylvania Gasmen Warned To Stop Sparring, Start Punching

"Stop Sparring—Start Punching for More Sales in 1950."

With that official admonition from its officers, the Pennsylvania Gas Assn. went into a one-day huddle at the Benjamin Franklin hotel, Philadelphia, Jan. 27 to devise a selling offense that would take full advantage of its secret weapons.

The occasion was the mid-winter sales conference, and the association drew on a stable of professionals who showed how the weapons—refrigerators, water heaters, and ranges—could deliver the proper knock-out blow to competition. Gordon Malone of Servel, W. D. Williams of Public Service of Newark, and Carl Sorby of Roper Corp. were the respective tutors.

Two other top addresses featured Hugh H. Cuthrell, AGA president, and Robert A. Whitney, National Sales Executive president from New York.

Boiler Committee Named

Dr. S. F. Whirl, Duquesne (Pa.) Light Co., and W. L. Webb, American Gas & Electric Service Corp., last month were elected to membership on the American Society of Mechanical Engineers' joint research committee on boiler feedwater studies.

Dr. Whirl heads the committee, while Mr. Webb will continue as chairman of the steam contamination subcommittee.

NEW for Gas Heating!
MULTI-STAGE
FLAME CONTROL
with a Single-Contact Thermostat!
It's GASAPACK Model 54
Steadier room temperatures never before possible — that's what you can guarantee when you equip your furnace or floor furnace with new GASAPACK. The GASAPACK, plus the Automatic Electric Top, Heat-Anticipating Thermostat, and Transformer, offers you a new principle in automatic gas heating. Not just pilot to high fire flame control, but Automatic MULTI-STAGE heating that keeps your furnace in perfect "tune with the weather" at any season.
Your new furnace—and your customers — deserve this revolutionary new MULTI-STAGE gas flame control accuracy. Be sure you check the whole story on new A-P GASAPACK. Write for catalog and samples.
GASAPACK MODEL 54 GAS CONTROL
for Furnace and Heaters, with Automatic Electric Top, Heat-Anticipating Thermostat, and Transformer.
A single basic unit that avoids the need for separate controls like main valve, pressure regulator, pilot filter, A-cock, B-cock, and others.
Silent in operation • 100% Fail Safe • 100% Safe Lighting • 100% Shut-Off • A.G.A. Listed • Only ONE basic control to buy, install • Saves assembly and field installation time • Reduces control costs • Requires less space • Capacity, 70,000 or 100,000 B.T.U. on gases less than or more than 800 B.T.U. per cu. ft.
AUTOMATIC PRODUCTS COMPANY
2526 North Thirty-second Street, Milwaukee 10, Wisconsin
Millions Know the Satisfaction of
DEPENDABLE Controls
FOR HEATING . . . AIR CONDITIONING . . . REFRIGERATION

EXPANSION

Oak Ridge Seeks Firm To Operate Gas System

Oak Ridge, Tenn., home of the atomic bomb, now has a natural gas supply. But it is looking for someone to peddle it.

Last month the Atomic Energy Commission began inviting bids from private interests for construction and operation of a natural gas utility system to serve the city of 30,000. The commission action followed the completion in December of a natural gas line by East Tennessee Natural Gas Co.

The announcement was in line with the commission's policy of attempting to attract private enterprise. Although the city is located on a government reservation, the state has retained sovereignty, and the city may soon start proceedings to incorporate. It is believed that the population will remain relatively stable.

Detailed information for bidders was made available Jan. 23.

Natural Gas Spreads Through Eastern Wisconsin

The advance of natural gas, brought through the gigantic Michigan - Wisconsin pipeline from rich fields in the southwest, is beginning to envelope the eastern portion of Wisconsin.

And where it hasn't already begun to invade, customers and cities are beginning to seek it out.

Milwaukee, principal Wisconsin target of the pipeline, had completed its changeover, and the county last month was nearing completion. By the end of January, it was predicted that Madison, the state capital, would be 65% converted. The job, carried on by the local utility, Madison Gas & Electric Co., was begun Dec. 5. Meanwhile, space heating restrictions had been lifted.

Wisconsin Gas & Electric Co., meanwhile, was speeding conversions throughout its service area. South Milwaukee and nearby Cudahy, as well as Kenosha and Racine, are reportedly either in the process of changeover or ready to start.

By mid - 1950, Waukesha, Whitewater, Watertown, Jefferson, Oconomowoc, Ripon, Fond du Lac, Green Bay, Appleton, and Oshkosh will be changing over.

The wholesale conversions are permitting widespread easement of space heating bans.

American Standard's New Plant

A new plant for making vitreous china ware has been formally opened in New Orleans by American Radiator and Standard Sanitary Corp. (Pittsburgh).

More than 1500 pieces of china ware a day will be furnished by the plant to the plumbing fixture market. The plant will employ 400 persons, and will allow the five other American-Standard potteries to serve markets in their immediate areas. Heretofore, vitreous china ware has been shipped from the north into the fast-expanding central south, which will now be supplied by the New Orleans plant.

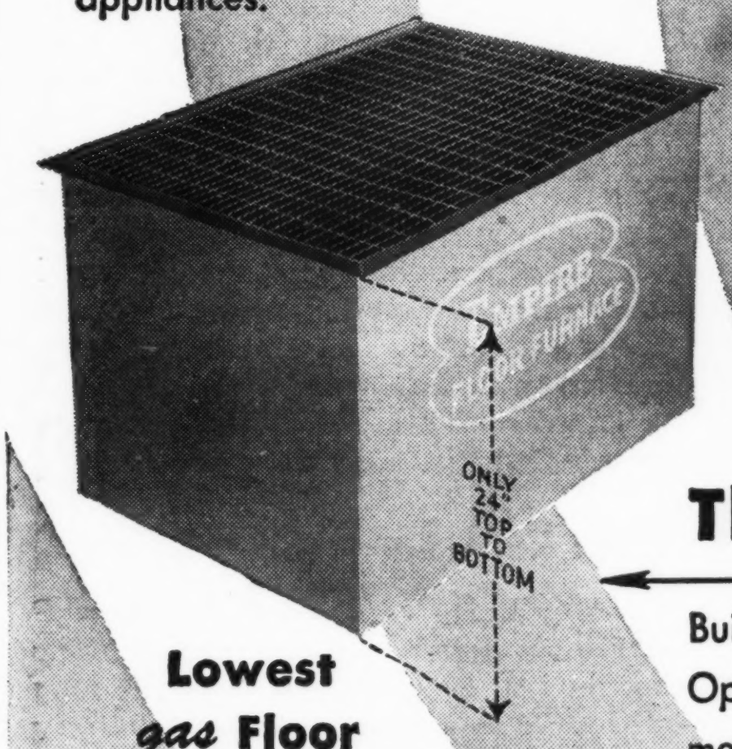
You can make more Sales with the EMPIRE Line

America's Largest Selling Gas Floor Furnace

Superior Performance of EMPIRE Gas Floor Furnaces makes them first choice to heat with Gas. The exclusive "Thriftmatic" gas burner used in their operation gives more efficiency, — maximum heating results with low gas consumption. Scientific construction with finest materials provides long life, — safe operation and complete customer satisfaction. You can build for profitable business in offering your customers these fine appliances.

The EMPIRE DeLuxe

Built in several suitable sizes. Meets requirements for years of carefree heating service. The demand has been constantly increasing from coast to coast because of the better EMPIRE engineering.



The EMPIRE "Lo-Boy"

Built for low initial cost where only a small heating unit is needed. Operates with the exclusive Thriftmatic burner. Enables you to meet price competition at a profit.

Lowest *gas* Floor Furnace

See The EMPIRE Representative in Your Territory or Write Us Direct

EMPIRE STOVE CO., BELLEVILLE, ILLINOIS

MANUFACTURERS OF GAS HEATING AND COOKING APPLIANCES

Extra Winter Supply Sought for Morgantown

Monongahela Power Co. and its subsidiary, State Line Gas Co., both of Fairfield, W. Va., have asked the Federal Power Commission to issue an order directing Manufacturers Light & Heat Co. to supply them with a minimum of 1 MMcf of natural gas daily during the cold weather months for distribution in the Morgantown, W. Va., area.

The applicants are presently supplied with gas by Hope Natural Gas Co., Pittsburgh and West Virginia Gas Co., Carnegie Natural Gas Co., and some independent producers. The application says that the additional gas is needed to meet what the companies describe as "an emergency heating problem in the Morgantown area" brought on by the operation of approximately 765 new gas heating installations, installed early last year.

The two companies also seek authorization to construct the facilities necessary to receive the gas from Manufacturers. Total cost would be $1865.

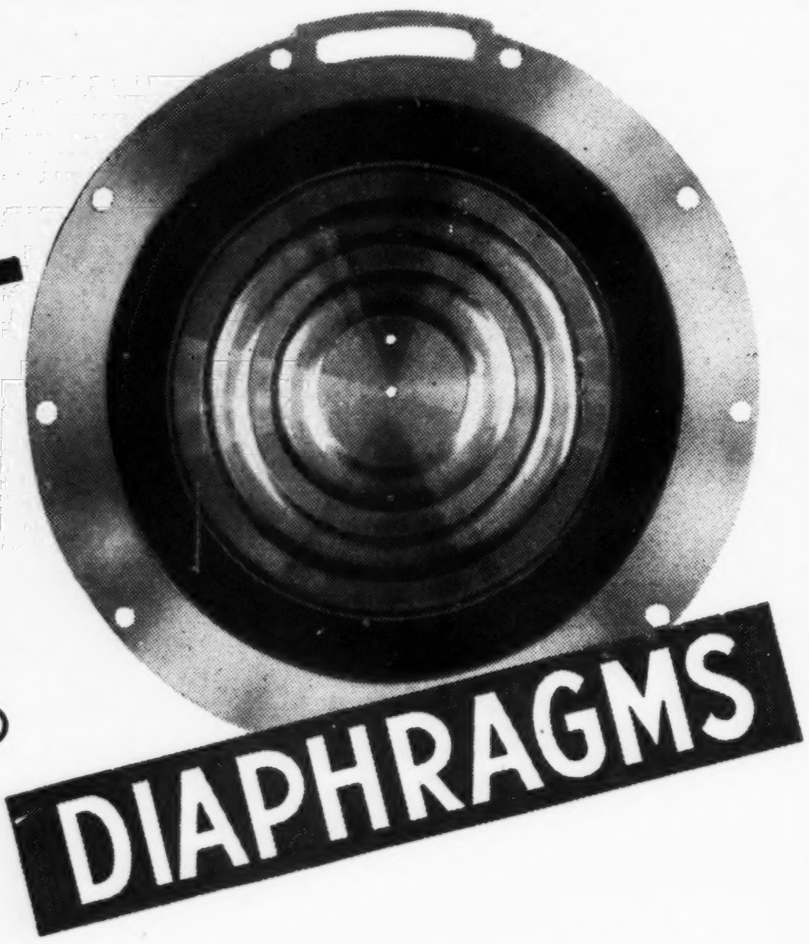
Bryant Gets New Orleans Agent

New distributor in New Orleans for the Bryant Heater Division of Affiliated Gas Equipment, Inc., is the Bryant-Leaumont Co., Bryant Sales Director J. N. Crawford has announced.

The newly-formed company, which will handle Bryant products exclusively, is headed by Walter Leaumont.

METAL RIM

LMPCO



DIAPHRAGMS

FOR

SPRAGUE No. 1-A	IRONCLAD No. 1	ALSO:
SPRAGUE No. 1-D	TOBEY No. 1	ALL-LEATHER
SPRAGUE No. 2	Iron	DIAPHRAGMS for
SPRAGUE No. 3	Gas	TOBEY-A and
SPRAGUE No. 5	Meters	IRONCLAD No. 2

We have specialized in Metal Rim Diaphragm manufacturing, under the best engineering skill, for twenty-odd years.

Records definitely show the superior advantage of these diaphragms over all others, and this should give you that feeling of confidence which only years in service can produce.

Reasons Why—

METAL RIM DIAPHRAGMS

Measure Gas Accurately:—

- NO WETTING
- NO BLOCKING
- NO FORMING
- NO STRETCHING THE LEATHER

Plus—

Our LMPCO oil which stays in the leather easily through a 10-year period.

LANCASTER METER PARTS CO.

Post Office Box 378 Lancaster, Ohio

Footnotes on Expansion

Tuscaloosa, Ala., is rolling along with a tremendous expansion program which added 1200 new customers in 1949 and will add another 1600 in 1950, local manager B. M. Smilie of the Alabama Gas Corp., has announced. On the basis of 7700 customers at the start of the program last year, the 2800 additions amount to more than a one-third increase . . . Stacey-Dresser Engineering Corp. is in the process of moving its headquarters to Cincinnati, where it will have the same address as its parent company, Stacey Bros. Gas Construction Co. (a Dresser Industries Inc. subsidiary), at PO Box E (5535 Vine St.), Cincinnati 16 . . . Equitable Gas Co., Pittsburgh, made over 13,000 gas heating installations in Allegheny county in 1949, expects to add 10,000 more this year. Now more than 67,000 of its 190,000 residential customers heat with gas.

Increased availability of LP-Gas and conversion to natural gas enabled the Wisconsin Public Service Commission last month to rescind its three-year-old space heating ban in the cities of De Pere and Allouez . . . At the end of December, the Illinois Commerce Commission lifted restrictions in East St. Louis, Belleville, Granite City, and Hillsboro, four Illinois cities served by Illinois Power Co. Increased supplies from Mississippi River Fuel Corp. made the move possible . . .

REGULATION

Court Refuses to Dismiss Washington Gas Light Suit

Washington (D.C.) Gas Light Co.'s efforts to have dismissed a suit brought against it for its activities in the appliance merchandising field met with a rebuff last month when District Court Judge David A. Pine decided to let the case be heard "on its own merits."

Company attorneys, thereupon, were quoted as declaring they would take the case to the U. S. court of appeals.

Appliance dealers brought the suit to enjoin the company from engaging in active merchandising, holding such activities to be unfair competition. The contention was introduced into Washington Gas Light's rate case several months ago, but the company was granted an increase nonetheless.

The plaintiffs argue that the company's charter limits its sales to the fuel itself.

Alum Rock Tariff Case Opens

Alum Rock Gas Co., Port Allegheny, Pa., which has reported net losses to the FPC both for the year ended August 1949 and for the period 1944-48, has filed a new natural gas rate tariff which the FPC suspended late in December.

The commission will hear Alum Rock's case on Feb. 20 in Washington, to determine the suitability of the company's proposed tariff, which would add $53,000 annually to the bill paid for Alum Rock gas by United Natural Gas Co., Oil City, Pa. United Natural, which purchases 96% of Alum Rock's gas, for its transmission system in Pennsylvania and Ohio, has filed a protest against the proposed rate increases.

Greater Than Ever Before...

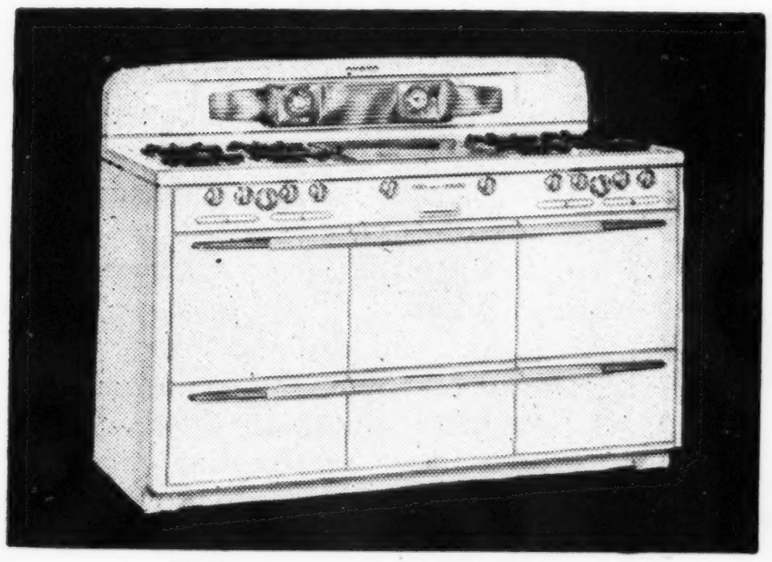
BE SURE TO ASK ABOUT IT

ROPER STORY

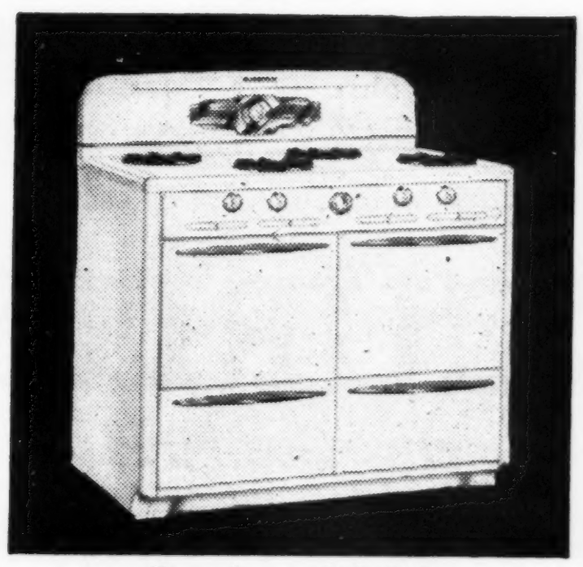
Series 7300

More Features To Talk About... More Value To Sell

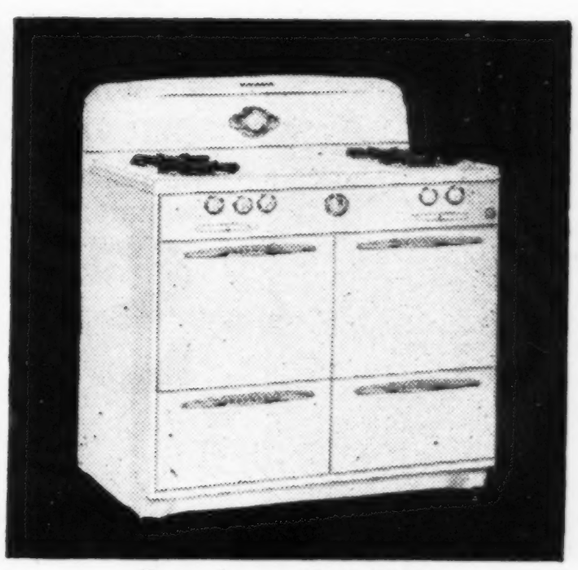
Newer Than The Newest...Sparkling with Profit-Making Sales Features



"Town and Country"



Series 3800



Series 3400

Above are shown only a few ranges from the extensive new 1950 Roper line. Here you'll find a model in every price bracket . . . a model for every situation.

GEO. D. ROPER CORPORATION • ROCKFORD, ILLINOIS

Offices and Warehouses in Principal Distribution Centers

FPC Drops Panhandle Probe

The proceedings instituted Oct. 26, 1948, involving investigation of the transfer of natural gas reserves from Panhandle Eastern Pipe Line Co. to Hugoton Production Co., a subsidiary, in exchange for that company's stock, was dismissed early in January by FPC.

In its dismissal order, the commission pointed out that in a companion case last June, the Supreme Court upheld a lower court in its ruling that denied the commission's motion for injunction against Panhandle's distribution of the stock, pending FPC proceeding. The lower court subsequently entered an order dismissing the commission's complaint.

FINANCIAL

SoCal Interim Rate Boost To Net $5.7 Million

Interim rate increases which will bring the company an estimated revenue boost of $5.7 million a year were granted Southern California Gas Co., Los Angeles, by the California Public Utilities Commission last month. The new prices became effective Feb. 1.

The estimated revenue increase is less than half the $12 million the company had sought on an emergency basis, and only a little more than a third of the $16.7 million asked for its permanent rate structure. Of the total granted, $2.3 million will go for taxes and $3.4 will be added to the company's net.

By virtue of the commission's action, domestic gas bills will go up an average of 10.8%, firm industrials 5.6%.

SoCal's case has been pending before the state body since last May. The interim change —the first boost in many years—was sought during the course of hearings in October.

Property Transfer Asked

The acquisition and operation by Alleghany Gas Co. of all the natural gas facilities of North Penn Gas Co. and Dempseytown Gas Co. has been proposed in an application filed by the company with the Federal Power Commission.

The three companies, all of Port Alleghany, Pa., submitted the proposal in a joint application.

Alleghany and Dempseytown are both subsidiaries of North Penn, which in turn is a subsidiary of Pennsylvania Gas & Electric Corp. That organization, in a process of reorganization pursuant to the Public Utility Holding Company Act of 1935, has explained to the commission that the Alleghany-Dempseytown-North Penn transfer is part of the overall simplification program.

October Revenues $72 Million

Natural gas companies reporting to FPC had operating revenues of $72,247,861 in October, a 4.7% increase over the total for October 1948.

Gas utility operating income for October was down 3.4% from the total of $9,208,038 reported for the same month last year, and totaled $8,896,171. Net income for the month was about the same: $8,544,957 for last October, $9,303,799 for October a year ago.

Gas sales were 121,998,000,000 cu ft last October, an increase of 1.5% over the like period in 1948. For the 12 months ended Oct. 31, 1949, gas operating revenues were up 12.9% over the previous period.

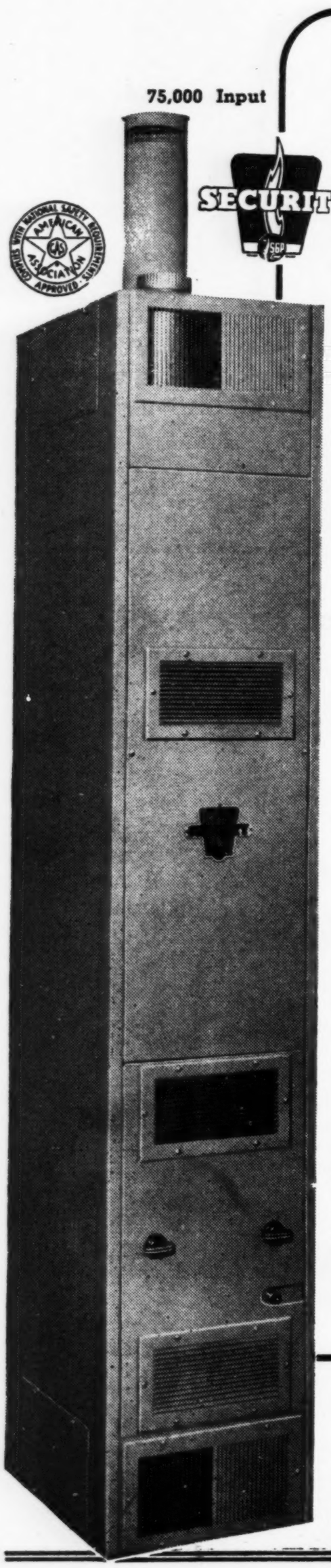
Term Loan Bid Competitively

The *Wall Street Journal* reports what it terms "a new twist" in corporation borrowing. Consolidated Natural Gas Co., New York, a major holding company, took competitive bids for a $14-million five-year term loan, a deviation from the usual practice of negotiation.

It was said that the lowest interest rate offered by any of the competing banks was 2%, while the highest was 2.35%, the former figure representing the lowest rate offered on a five-year term loan since the downturn in interest rates began in early 1949.

Financial Footnotes

. . . On Jan. 9, Standard Gas & Electric Co. passed the deadline for appealing the October decision of the court of appeals directing dissolution of the Philadelphia Co., its subsidiary. Thus Standard Gas must abide by the decision which upheld an SEC order of June



NOW...

a TRULY Forced Air

INN-A-WALL

...and you can employ duct work where necessary!

YES, sir . . . here is *the* answer to heating properly small homes without basements. Security's INN-A-WALL is an entirely new principle in forced air heating! Requires minimum duct work . . . may be used without ducts. Needs only 16 by 20-inch floor area.

The INN-A-WALL reverses the usual flow pattern . . . warm air comes out the *bottom*. This means *warm floors!* Warm air can be taken from all four sides . . . return air, from all sides at the top. Where ducts are required for distant rooms, permanent connection is made at the bottom. Completely assembled . . . ready to install. Casing height, 88 inches. Security breather tube automatically supplies air for combustion.

Other outstanding INN-A-WALL values are • Quiet positive blower • Fully automatic • Special Security high-efficiency burners • Complete adaptability to any floor plan • Amazingly economical in price.

SECURITY

Automatic, Gas-Fired

INN-A-WALL FURNACE

Write Today . . . don't delay. Get all the facts about this revolutionary new furnace.

SECURITY MANUFACTURING CO.

1630 OAKLAND STREET • KANSAS CITY 3, MISSOURI

1948, directing that the subsidiary dispose of gas and transportation holdings . . . the New York appeals court recently upheld the $21.5 million slash in Consolidated Edison of New York's electric rates ordered earlier by the state public service commission and in effect since January 1949. The decision reversed a decision handed down last March by the appellate division, third department, which had held the commission order illegal . . . Nassau Associates Inc., a subsidiary of Dillon, Read & Co., has announced the purchase of 30% interest in fully developed natural gas leaseholds aggregating 30,000 acres in the "Carthage Joint Venture" area of Texas. At the same time Sabine Natural Gas & Products Co. purchased 30% interest in the processing plant serving the acquired leaseholds. Aggregate price was in excess of $12.5 million . . . The California Public Utilities Commission, reporting for 1949, has shown that the average rate of return for all utilities in the state was up to 5.11% from the previous year's 5.05%. But Southern California and Southern Counties were not average, as earnings have been dropping . . . the FPC investigation of rates charged by United Natural Gas Co., Oil City, Pa., instituted Dec. 20, 1948, has been dropped. FPC says no further probe is needed now that the company has reduced annual revenues $252,000 under a new tariff filed Dec. 1, 1949 . . .

MISCELLANY

Gas Technology Institute Offers 16 1950 Scholarships

Sixteen two-year fellowships have been offered, effective September 1950, as a part of the Institute of Gas Technology (Chicago) educational program. The fellowships are for chemistry or chemical or mechanical engineering students in the upper fifth of their classes and are intended to prepare fellows for the gas industry while they are at work for their Master of Gas Technology degrees.

The graduate study, field training, and research offered are available to candidates under 28 years old.

Fellows will be paid a cost of living stipend for the 10 months of the academic year, in addition to the remittance of tuition and fees amounting to about $550 each year.

Applications for the fellowships may be addressed to the Director, Institute of Gas Technology, 3300 S. Dearborn St., Chicago 6.

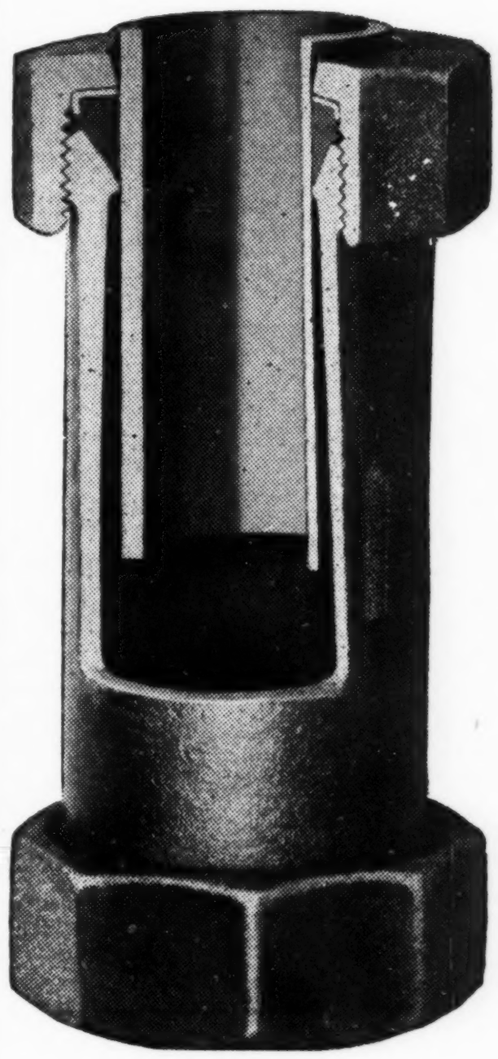
Hamilton Names Distributor

C. H. Rippe, sales director of the home appliance division, Hamilton Manufacturing Co., Two Rivers, Wis., has announced the appointment of a new distributor. Effective Jan. 1, the Stuart F. Louchheim Co., formerly the Motor Parts Co., has taken on the distribution of the Hamilton automatic clothes dryer in the Philadelphia area.

In addition to the dryer, the organization handles electrical appliances and Servels.

The Hamilton line will be under the supervision of J. M. Pawson, sales manager of the gas appliance division.

NORMAC
COUPLINGS, SLEEVES and FITTINGS

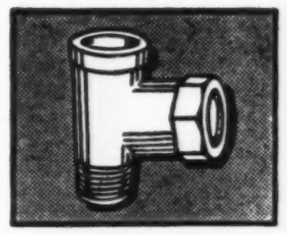


for maximum deflection, ease of "stabbing," complete confinement of the rubber!

So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

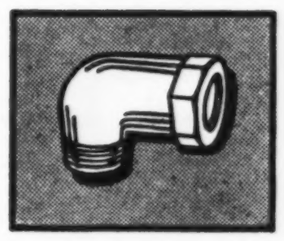
NORMAC COUPLINGS are made with 5" centers in all sizes. NORMAC SLEEVES are identical in design except that they are made with 10" centers. Nuts and gaskets are interchangeable.

COMPRESSION-END SERVICE "TEE"



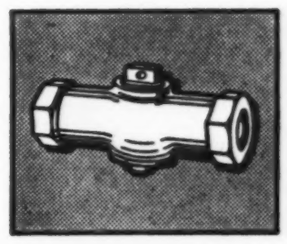
First fitting of this type ever produced with full coupling depth and special threads on male end to prevent dropping into old hand taps when used to replace standard threaded fittings.

COMPRESSION-END SERVICE "ELL"



Extra depth makes it possible to "stab" pipe into stops and without measuring, pull back a safe distance to allow ultimate deflection eliminating possibility of strain against tap in main.

COMPRESSION-END IRON BODY BRASS CORE SERVICE STOPCOCKS



End the necessity of threading on the job plus the elimination of the threads themselves — combining all the advantages of NORMAC COUPLINGS and the best in stopcock design. 2½" coupling depth on each end.

NORMAC BRASS FITTINGS DEVELOPED IN 1939 FOR USE WITH COPPER TUBING

Our complete line of brass fittings can be used either on new installations or where copper is run through old steel pipe in large or small openings. The center to end dimensions of NORMAC TEES correspond with old malleable iron fittings. This feature is extremely important in the use of these fittings in one foot openings where the tubing must line up with the steel which has been removed.

Write for the NORMAC CATALOG of Gas Distribution Equipment

NORTON-McMURRAY MFG. CO.

39 SOUTH LA SALLE ST. • CHICAGO 3, ILLINOIS

Couplings • Meter Bars • Sleeves • Cocks • Bell Joint Clamps • Service Tees & Ells

Herman Nelson Corp. Merges With American Air Filter

American Air Filter Co. Inc. (Louisville, Ky.) and Herman Nelson Corp. (Moline, Ill.) were merged, effective Jan. 6.

American Air Filter is a manufacturer of air filters and dust collectors, and is the surviving corporation; Herman Nelson, henceforth to be known as Herman Nelson division of American Air Filter, makes heating and ventilating equipment.

The merger consolidates headquarters of the new company in Louisville; Herman Nelson division will continue to operate its Moline facilities and will headquarter there.

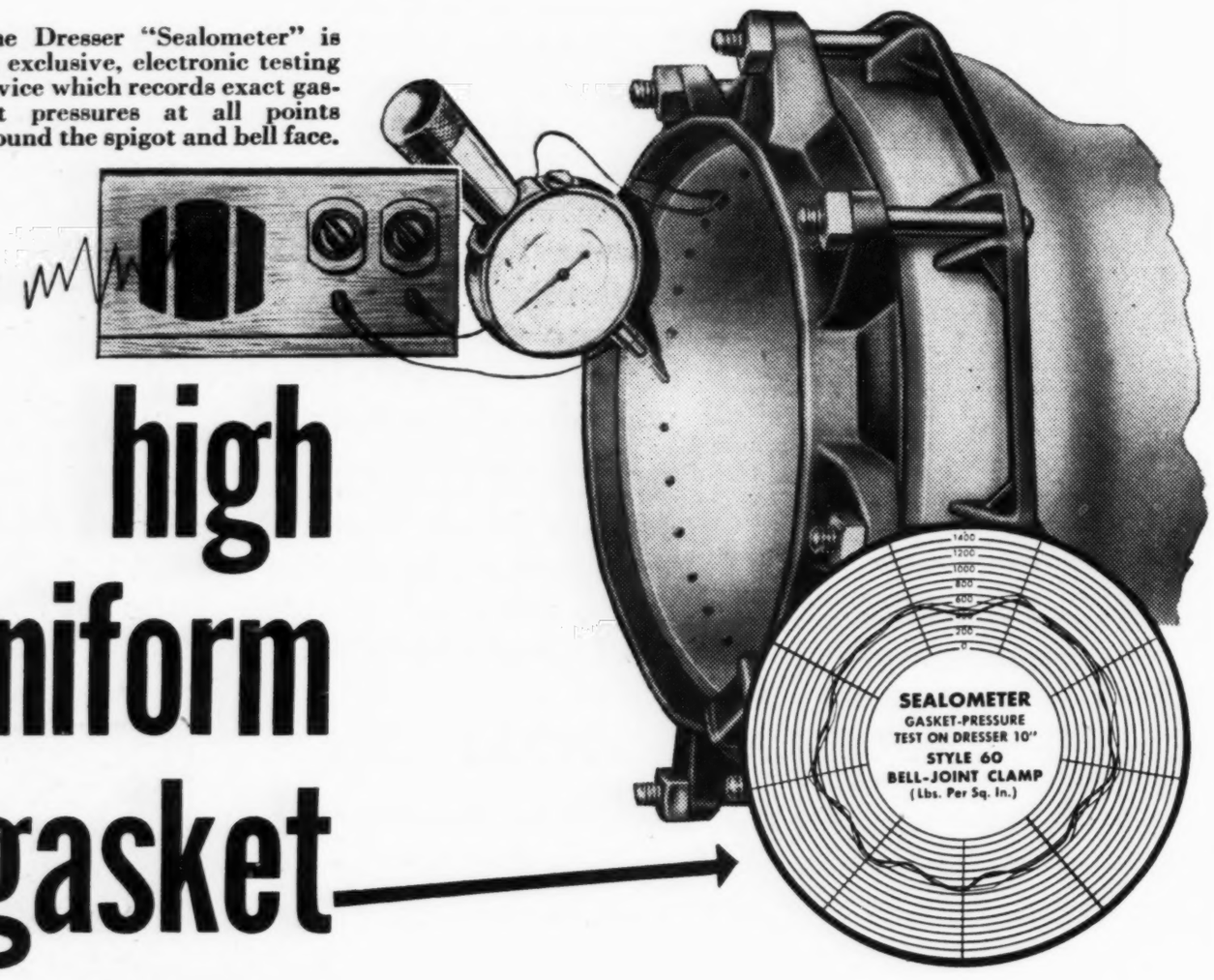
In the merger proceedings, W. G. Frank and Richard H. Nelson have been named directors of the combined firm, Richard H. Nelson and Robert W. Nelson have been appointed vice presidents, and E. G. Mason (of Herman Nelson) has been elected assistant secretary and assistant treasurer.

Servel Grabs Oscar

"An Oscar of Industry" has been awarded Servel Inc. by *Financial World* magazine in its yearly contest for the best annual reports prepared by industrial firms. Servel's 1948 report was judged the best in the Household Equipment manufacturers division.

Dr. William R. Hainsworth, Servel vice president, accepted the award for the company at the annual report awards banquet, held recently in New York.

The Dresser "Sealometer" is an exclusive, electronic testing device which records exact gasket pressures at all points around the spigot and bell face.



high uniform gasket pressure

SCIENTIFICALLY PROVED, THE DRESSER STYLE 60 BELL-JOINT CLAMP ASSURES PERFECT SEALING

• In a bell-joint clamp, the *minimum* gasket pressure must always exceed the *maximum* line pressure in order to prevent leakage. Thus, the greater the ratio of gasket pressure to working pressure, the higher is the factor of safety of the joint.

The Dresser Style 60 Bell-Joint Clamp, because it is scientifically designed and tested to provide *uniformly high* gasket pressures, assures a wide margin of safety—a more perfect seal every time. Because it has "essential adjustability" and a close fit (even on off-size pipe), there are no weak points through which gasket pressures may be lost.

Check your stock of Style 60's today. Sizes 3″ thru 60″.

Fix it once . . .
Fix it for good!

DRESSER BELL-JOINT CLAMPS

Dresser Manufacturing Division, 59 Fisher Ave., Bradford, Pa. (One of the Dresser Industries) • In Texas: 1121 Rothwell St., Houston • In Canada: 629 Adelaide St., W., Toronto, Ont. • Sales Offices: New York, Philadelphia, Chicago, Houston, San Francisco.

Alabama Seeks Cheap Natural

Cheap natural gas must be made available in Alabama if the state is to enjoy real industrial growth, says Rep. Frank W. Boykin (D-Ala.).

Specifically, the lack of such cheap fuel is preventing a large eastern industry from locating in Mobile, Mr. Boykin said.

As a solution, he recommended that a state body be organized to develop mineral resources including gas and oil, sulphur, and salt fields.

No natural gas is presently being produced in Alabama. Neighboring Mississippi, on the other hand, is an increasingly important producer.

Housing Bulletin Off Press

As a part of the recently disclosed expansion of Washington aids to members of GAMA, (*GAS,* January, p. 52), Managing Director Leigh Whitelaw last month announced a new bulletin service intended to keep members better informed on what goes on in the national capital.

The first of a series of "Washington Reports," prepared by James R. Lee, new GAMA representative in Washington, dealing with "Housing Facts and Prospects," has been distributed.

Pertinent information on housing programs in the works is given.

GAMA Show To Go On

Gas Appliance Manufacturers Assn. will hold its biennial exposition in Atlantic City (N.J.) convention hall, from Oct. 2 to 6, it was announced last month.

As is GAMA's usual practice, the exposition is to be held in conjunction with the annual convention of the American Gas Assn., also to be held in Atlantic City.

GAMA also announced the names of five new members of the association, recently elected, who are: Heat Controller Inc., Addison, Mich.; Hynes & Cox Electric Corp, Waldorf, Md.; The Sunray Stove Co., Delaware, O.; White Products Corp., Middleville, Mich.; and Zick Sheet Metal Works, Dearborn, Mich.

More than 500 gas appliance manufacutrers are now members of the association.

Miscellaneous

There was no evidence that Wisconsin Power & Light Co. "failed to perform any duty," the state supreme court decided, so it was absolved of the blame for the death of four persons asphyxiated at Fond du Lac in 1946 when a gas pipe broke in their home. Damages which had been sought by relatives of three of the victims were thus denied. Cause of the pipe breakage was settling of the house, it was decided . . . Selas Corp. of America, heat processing engineering company, has moved its Chicago office to 3857 Washington Boulevard . . . Ruud Manufacturing Co., Pittsburgh, water heater maker, has bought a new manufacturing plant in Toronto, Ontario. The move to the new plant, which is triple the size of the old, was necessitated by the speedy expansion of natural gas and LP-Gas service in the dominion.

Old Faithful...

Yes, Old Faithful will spout hot water every hour — and you can depend on that . . .

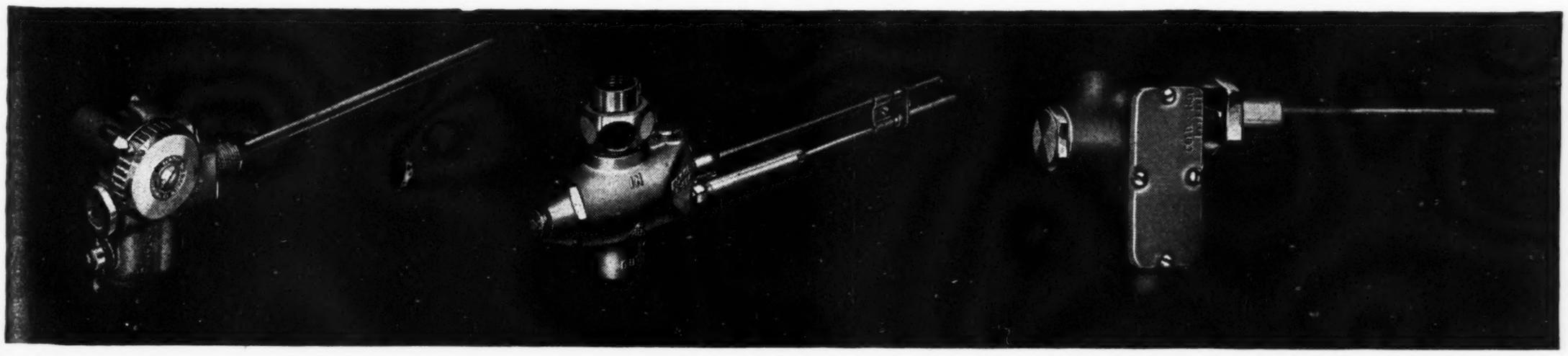
But, a modern Automatic Water Heater, equipped with TITAN CONTROLS, will deliver hot water **anytime,** for every household use — and you can depend on that, too!

For satisfied customers be sure that your heaters are equipped with

TITAN WATER HEATER CONTROLS

Write for data sheets and complete information on all TITAN CONTROLS.

THE TITAN VALVE & MANUFACTURING COMPANY
9913 ELK AVENUE **CLEVELAND 8, OHIO**



CALENDAR

MARCH

New England Gas Assn.—Hotel Statler, Boston, March 23-24.

AGA Residential Gas Section, Mid-West Regional Gas Sales Conference—Edgewater Beach hotel, Chicago, March 27-29.

Southern Gas Assn.—Galveston, March 27-29.

The Maryland Utilities Assn.—Lord Baltimore Hotel, Baltimore, Md., March 31.

APRIL

AGA Distribution Motor Vehicle and Corrosion Conference — Book Cadillac hotel, Detroit, April 3-5.

AGA Sales Conference of Industrial and Commercial Gas Section—St. Louis, April 4-6.

National Assn. of Corrosion Engineers—Hotel Jefferson, St. Louis, April 4-7.

Mid-West Gas Assn.—Hotel Lowry, St. Paul, April 10-12.

Southwestern Gas Measurement Short Course—University of Oklahoma, Norman, April 11-13.

National Petroleum Assn.—Hotel Cleveland, Cleveland, April 12-14.

Eastern Natural Gas Regional Sales Conference—Hotel William Penn, Pittsburgh, April 17-18.

National Conference of Electric and Gas Utility Accountants—Brown hotel, Louisville, April 17-19.

Florida - Georgia Gas Assn. 1950 Business Conference—Biltmore hotel, Palm Beach, April 20-22.

Indiana Gas Assn. — French Lick Springs hotel, French Lick, Ind., April 28-29.

MAY

AGA Commercial Gas School—Hotel Gibson, Cincinnati, May 1-5.

Oklahoma Utilities Assn. Annual Convention — Biltmore hotel, Oklahome City, May 4-5.

AGA Natural Gas Department Spring Meeting—Mayo hotel, Tulsa, May 8-9.

Liquefied Petroleum Gas Assn. Convention & Trade Show—Palmer House, Chicago, May 8-11.

American Foundrymen's Assn.—Cleveland, Ohio, May 8-12.

AGA Executive Conference — The Broadmoor, Colorado Springs, May 11-12.

Pennsylvania Gas Assn.—Galen Hall, Wernersville, Pa., May 16-18.

AGA Gas Production and Chemical Conference—Hotel New Yorker, New York, May 22-24.

National Restaurant Assn.—Navy Pier, Chicago, May 23-26.

The Natural Gas and Petroleum Assn. of Canada—Prince Edward hotel, Windsor, Ont., May 25-26.

Gas Appliance Manufacturers Assn. Annual Meeting—The Greenbrier, White Sulphur Springs, W. Va., May 28-30.

Short Course in Gas Technology—Texas College of Arts & Industries, Kingsville, May 29-31.

JUNE

Edison Electric Institute Annual Convention—Atlantic City, N. J., June 5-9.

Michigan Gas Assn. Annual Convention — Grand hotel, Mackinac Island, Mich., June 19-20.

Canadian Gas Assn. Annual Convention—Manoir Richelieu hotel, Murray Bay, Quebec, June 19-24.

AUGUST

Pacific Coast Gas Assn. 57th Convention—Seattle, Wash., week of Aug. 1.

SEPTEMBER

New Jersey Gas Assn. Annual Convention—Monmouth hotel, Spring Lake, N. J., Sept. 8.

Mid-West Gas Assn. 27th Gas School & Conference — Iowa State College, Ames, Sept. 14-15.

OCTOBER

AGA Annual Convention and GAMA Exhibition of Gas Appliances and Equipment—Atlantic City, N. J., Oct. 2-6.

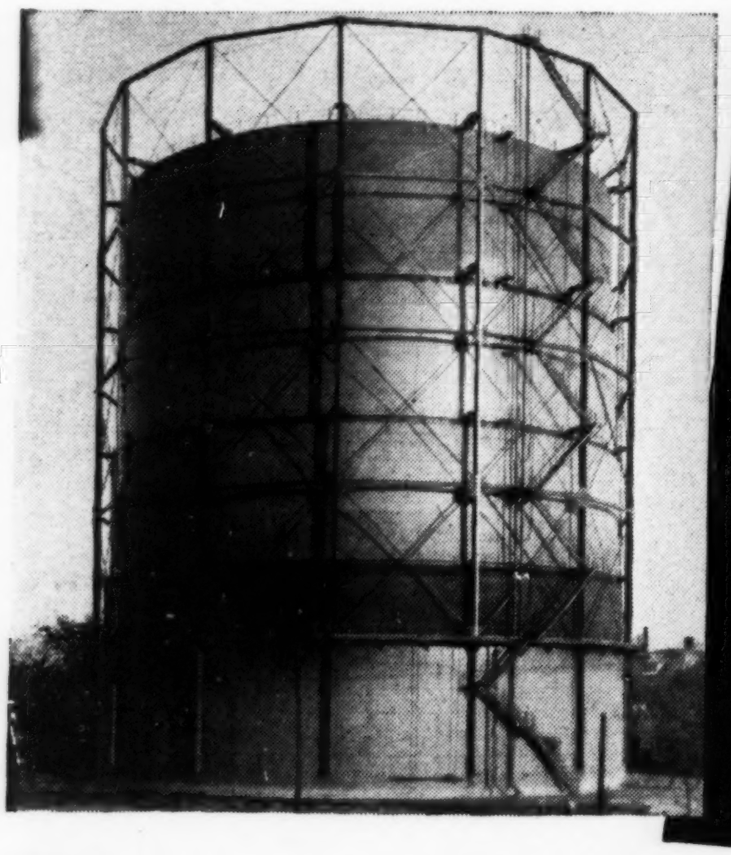
Texas Mid - Continent Oil & Gas Assn. Annual Convention—Dallas, Oct. 4-5.

National Safety Congress & Exposition of the National Safety Council—Chicago, Oct. 16-20.

National Metal Exposition—Amphitheatre, Chicago, Oct. 23-27.

STAMANCO

A TRADE NAME THAT STANDS FOR



SPECIALIZED EXPERIENCE • LEADERSHIP IN DESIGN • HIGHEST QUALITY WORKMANSHIP • OUTSTANDING SERVICE • DEPENDABLE PERFORMANCE •

Let us figure on your requirements.

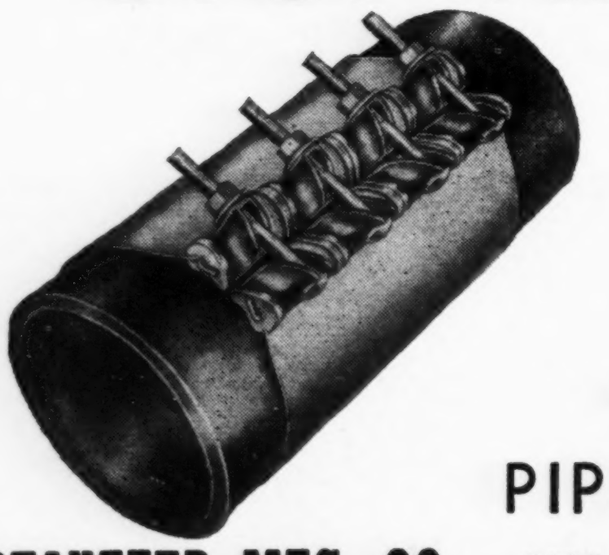
The STACEY MANUFACTURING Co.
CINCINNATI 16, OHIO
SINCE 1851

GAS HOLDERS • HI-PRESSURE TANKS • PURIFIER BOXES

ENGINEERS • FABRICATORS • CONSTRUCTORS

An Independent Organization Not Affiliated With Any Other Builders of Gas Holders

STOP THAT LEAK!



the FAST and EASY way

with STAUFFER PIPE REPAIR CLAMPS

STAUFFER MFG. CO. 8424 OTIS ST., SOUTH GATE, CALIF.

PEOPLE

JERRY T. DUGGAN, member of a Kansas City, Mo., law firm, has been named chief counsel of The Gas Service Co. of that city. He succeeded ROBERT D. GARVER, who had held the position from 1925 until his retirement last month. JAMES A. ABERCROMBIE, treasurer, also retired from the general office. Two other company officials who retired Jan. 1 were MICHAEL J. BARRY, secretary, who had been connected with the organization for more than 53 years, and E. A. WILDER, manager of the firm's Newton, Kan., property until he was placed on sick leave in 1946. His service with the company totaled almost 37 years.

F. H. SOCHOR, chief civil engineer of The Manufacturers Light & Heat Co., Pittsburgh, retired Dec. 31. His successor is J. A. LOUDON, who has been in the company's civil engineering department since 1928. ROBERT M. NEILL and H. R. WEITZEL were named assistant chief civil engineer and assistant superintendent of compressor stations, respectively. D. K. RUTH, since 1948 in charge of constructing the firm's new short wave radio system, was named engineer of communications.

W. C. PIERSON has been appointed general superintendent of Philadelphia Electric Co.'s gas transmission and distribution department, succeeding the late Paul Fusselman. Since 1924 Mr. Pierson has held various posts in the company's gas and appliance service departments. Most recently he was general superintendent of the building management department.

GEORGE BOWERSOX has been appointed regional manager of Coast Counties Gas & Electric Co., Santa Cruz, Calif., and will direct the company's operations in Contra Costa county. His headquarters will continue to be in Concord, Calif., where he has been located for the past year as assistant regional manager and, more recently, as acting regional manager.

L. T. W. TIMBERLAKE has joined the M. M. Hedges Manufacturing Co. Inc., Chattanooga, Tenn., as manager of the utility sales division. The division has been organized to market an automatic gas storage water heater especially designed for gas utility requirements and to be distributed only to utilities. Mr. Timberlake has been in the gas utility sales field since 1922.

ALLISON R. COLLARD recently was appointed manager of the substation operation department, Consolidated Edison Co. of New York, succeeding GEORGE SUTHERLAND, who retired. Substation operation is responsible for the operation and maintenance of ConEd's 62 electric substations and 11 gas holder stations. Mr. Collard joined the utility in 1920.

M. H. PARKINSON was elected vice president of The United Gas Improvement Co., Philadelphia, at a recent meeting of the board of directors. Mr. Parkinson will retain his title as comptroller.

Having SLIDE RULE trouble?

When the problem is moving air or gas, turn to *R-C dual-ability* for accurate, dependable answers

That's one job we know, inside-out. For almost a century, we've been air-and-gas specialists, exclusively. Without being immodest, we think our engineers are the best informed in the industry, on blowers, exhausters, gas pumps and related equipment.

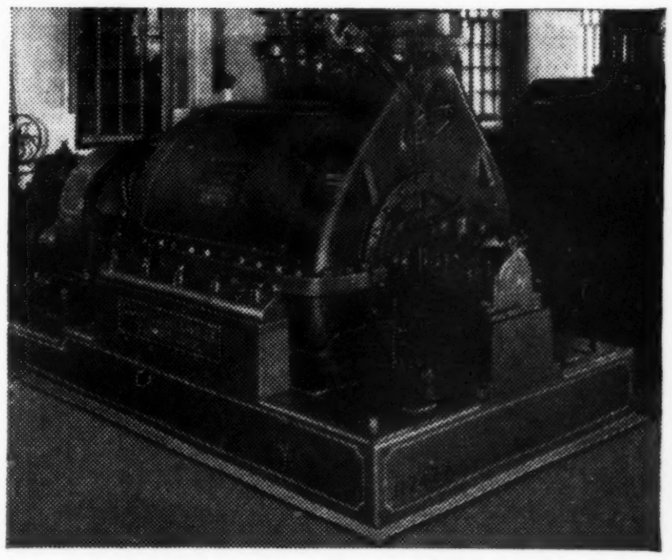
They have an extensive line to draw on, too. They make unbiased recommendations between Centrifugals and Rotary Positives—we're the only company offering this *dual choice.* With capacities ranging from 5 cfm to 100,000 cfm, we can supply standard units closely matched to the job, for efficiency and economy.

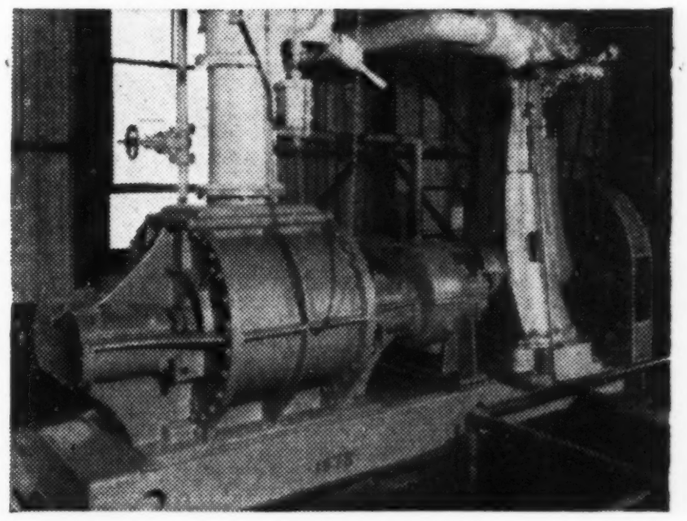
As to how R-C equipment performs, our old-time, repeat customers are the best answer to that. They'll testify that you will reduce your buying and operating problems when you call on R-C air-and-gas specialists.

ROOTS-CONNERSVILLE BLOWER CORPORATION
502 Oregon Avenue, Connersville, Indiana

CENTRIFUGAL

5-stage Centrifugal Gas Booster for public utility. Capacity 14,000 cfm.





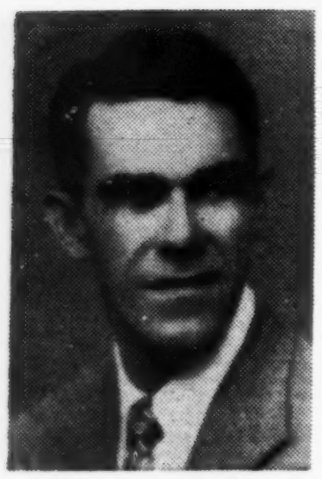
ROTARY

Type RCG Rotary Positive Gas Pump in manufactured gas plant. Capacity 3,300 cfm.

ROOTS-CONNERSVILLE

BLOWER BUILDERS R-C SINCE 1854

ONE OF THE DRESSER INDUSTRIES



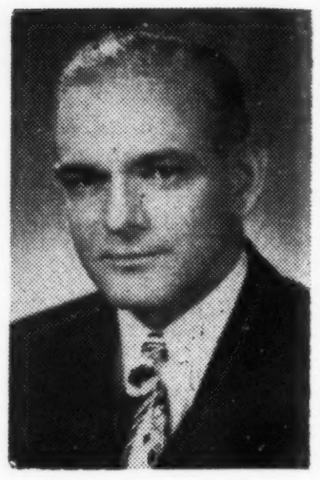
Paul Kennedy
... Servel

C. L. Jamesson
... Caloric

J. W. Northcutt
... Rockwell Mfg.

O. R. Candler

Paul Inskeep
... Detroit-Michigan Stove



L. E. Clancy

PAUL KENNEDY has been appointed director of retail sales development for Servel Inc., Evansville, Ind. Mr. Kennedy has been handling the company's training and selection program. Three Servel dealer managers and refrigeration sales specialists have been transferred to the retail sales department and will work with Mr. Kennedy in handling the sales training program. They are BYRON A. BLIVEN, LEONARD HADLEY and D. P. FINNEY.

CHARLTON L. JAMESSON, former director of the gas appliance promotion division of Ketchum, McLeod & Grove Inc., Pittsburgh, has been appointed district sales representative in the Pittsburgh metropolitan area for Caloric Stove Corp., Philadelphia.

J. W. NORTHCUTT has succeeded C. C. MOORE as Atlanta district sales manager for Rockwell Manufacturing Co., Pittsburgh. Mr. Northcutt has been associated with the company since 1936, recently handling major oil and engineering company accounts in the Houston district. Mr. Moore, a Rockwell employee since 1930, has been transferred to manager of the company's new district office in Columbus, Ohio.

OTIS R. CANDLER has been appointed vice president in charge of all manufacturing operations of Detroit-Michigan Stove Co. Mr. Candler joined the firm in 1926 as assistant superintendent and became factory manager in 1942. The company's new director of sales is L. E. CLANCY, former sales manager of the Garland commercial range division and, prior to that, advertising and sales promotion manager. PAUL INSKEEP has been named to the Garland division post. He was formerly central division sales manager.

TOM E. HAYES resigned as director of personnel and public relations for the Milwaukee Gas Light Co. as of Dec. 31 and announced plans to go into private law practice. Mr. Hayes, who had been with Milwaukee Gas for 15 years, represented the firm in hearings before the public service commission, city councils, and town and village boards. He was also active on bargaining committees dealing with labor.

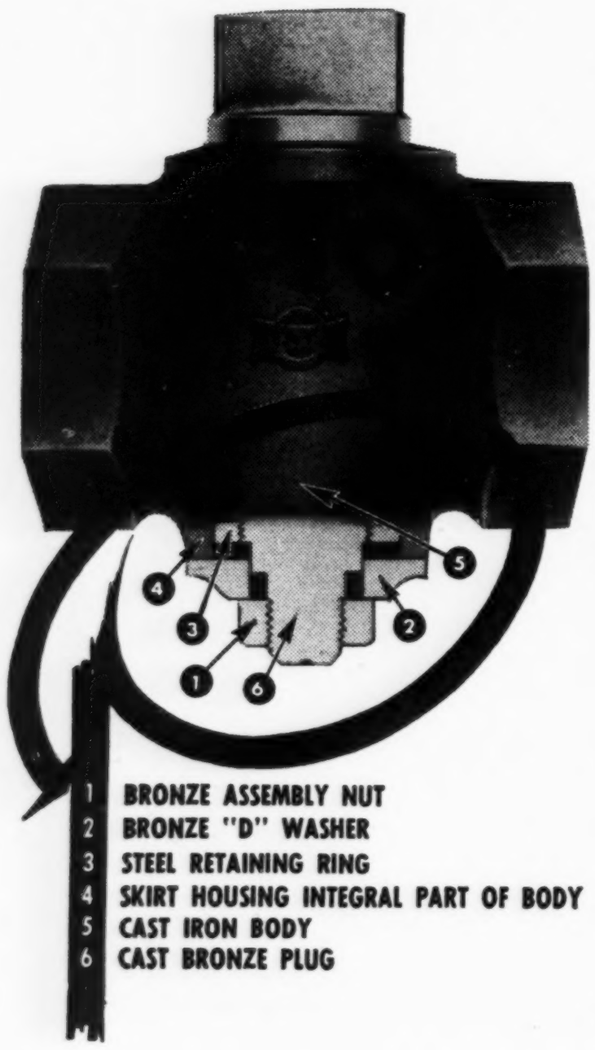
C. B. FARRELL has joined Gas Construction & Service Co. Inc., New York City, as chief field engineer. Mr. Farrell is well known for his work in natural gas changeovers for Consumers Power Co. in Michigan, as well as for several other companies. He is now engaged in the changeover at Hagerstown, Md.

ROBERT E. HAMILTON, vice president of Stone & Webster Engineering Corp., New York City, retired Jan. 1 after 48 years with the organization.

HAYS®

TAMPER-PROOF GAS STOPS

FEATURES


1 BRONZE ASSEMBLY NUT
2 BRONZE "D" WASHER
3 STEEL RETAINING RING
4 SKIRT HOUSING INTEGRAL PART OF BODY
5 CAST IRON BODY
6 CAST BRONZE PLUG

- Tamper-Proof Design with Non-Removable Plug.
- Extra Grade Gray Iron Body, Gas Service Bronze Plug.
- Steel Retaining Ring Prevents Removal of Plug.
- Steel Retaining Ring Assembled to Bottom of Plug—Eliminates Possible Damage to Precision Ground Surface of Plug and Body.
- Steel Retaining Ring Threaded and Staked to the Largest Metal Diameter on Bottom of Tapered Plug—Assures Retention without Distortion.
- Steel Retaining Ring Anchored without Drill Hole or Pin—Eliminates Possible Shearing of Plug.
- Steel Retaining Ring Located below Shoulder of Body—Permits Freedom for Service Adjustment of Plug.
- Steel Retaining Ring Recessed and Inaccessible within Iron Body—Gripless and Shearless.
- Plug and Body Precision Ground and Matched for Perfect Seating.
- Individually Tested Under Rigidly Controlled Inspection.
- Lubricated with a Compound of Greases Suitable for Use with Manufactured, Natural or Liquid Petroleum Gases.
- Obtainable in a Variety of Patterns.

Write for Folder 120–C

AVAILABLE IN
Black or Galvanized
Flat Head Less Check
Flat Head With Check
Flat Head With Lock-Wing
Sizes; ¾"—1"—1¼"—1½"—2"

Also HAYS STANDARD
HEAVY PATTERN IRON BODY GAS STOP

For 75 Years the Gas Industry has relied on HAYS Iron Body Gas Stops

C. C. RAUSCH heads a list of appointees to the staff of Dearborn Chemical Co., Chicago. Mr. Rausch has been named manager of the industrial department's "No-Ox-Id" rust preventive sales. Other promotions include those of J. G. SURCHEK to manager of production and maintenance No- Ox- Id sales; E. M. WELCH to manager of sales of water treatment and equipment in Chicago; C. S. SILSBEE to assistant manager in charge of national accounts and service; A. H. REYNOLDS to director of product development with L. O. GUNDERSON as assistant director; DR. WAYNE L. DENMAN to directing chemist of Dearborn laboratories; MILTON H. HAGMAN to controller, replacing ADOLPH GEIDEL, who retired; and FRED W. MAYER to auditor.

J. W. SIMPSON, executive vice president of Mueller Co. Decatur, Ill., recently was honored upon completion of 50 years' service with the firm. He received a diamond-studded 50-year emblem at ceremonies presided over by Lucien W. Mueller, chairman of the board. Mr. Simpson's service has been continuous since 1899 except for a brief leave of absence in 1907. His first position was that of errand boy and he became general sales manager in 1917, vice president in charge of sales in 1929, and executive vice president in 1947. He is the only person now actively connected with the company who was associated with Hieronymus Mueller, founder.

J. W. Simpson

C. W. BONAR, sales training director of Tappan Stove Co., Mansfield, Ohio, recently was promoted to manager of the LP-Gas division. The assistant promotion manager, W. J. DAUGHERTY, has been named sales training director, and G. S. CONDOS, director of public relations, has taken on new responsibility as assistant director of merchandising.

HERBERT M. REEVES, chief engineer of Florence Stove Co.'s Kankakee, Ill., plant, has been promoted to the newly created position of director of product engineering. He will be in charge of research, development, and new product engineering for the Florence plants at Kankakee; Gardner, Mass.; and Lewisburg, Tenn.

HOWARD E. FERRIS, vice president and chief engineer of South Atlantic Gas Co., Orlando, Fla., recently was elected to fill a vacancy on the board of directors. Mr. Ferris has been an executive of South Atlantic since the comany was organized.

W. S. HARTMAN, for 30 years an employee of Perfection Stove Co., Cleveland, Ohio, has been named assistant sales manager of the company's new Acorn-Oriole sales division. When Perfection acquired the domestic range assets of Standard Gas Equipment Corp., Baltimore, several months ago, Mr. Hartman played a major part in taking the equipment to Cleveland. W. H. NICHOLS, a Perfection salesman for the past 28 years, has been named to head the Cleveland sales district. He succeeds W. M. BARBER, newly appointed sales promotion and advertising manager.

COL. CHARLES G. BLAKESLEE, general counsel and a director of the Long Island Lighting System, retired on Dec. 1. He joined the system in 1936 after a distinguished military and public service career. Colonel Blakeslee served on the New York Public Service Commission and, on the expiration of his term as commissioner, was appointed special counsel and later chief counsel to that body. DAVID K. KADANE has been appointed to succeed him in handling the system's legal affairs. HARRY C. HAGERTY, vice president and treasurer of Metropolitan Life Insurance Co., New York, has been elected to replace Colonel Blakeslee on the board of directors.

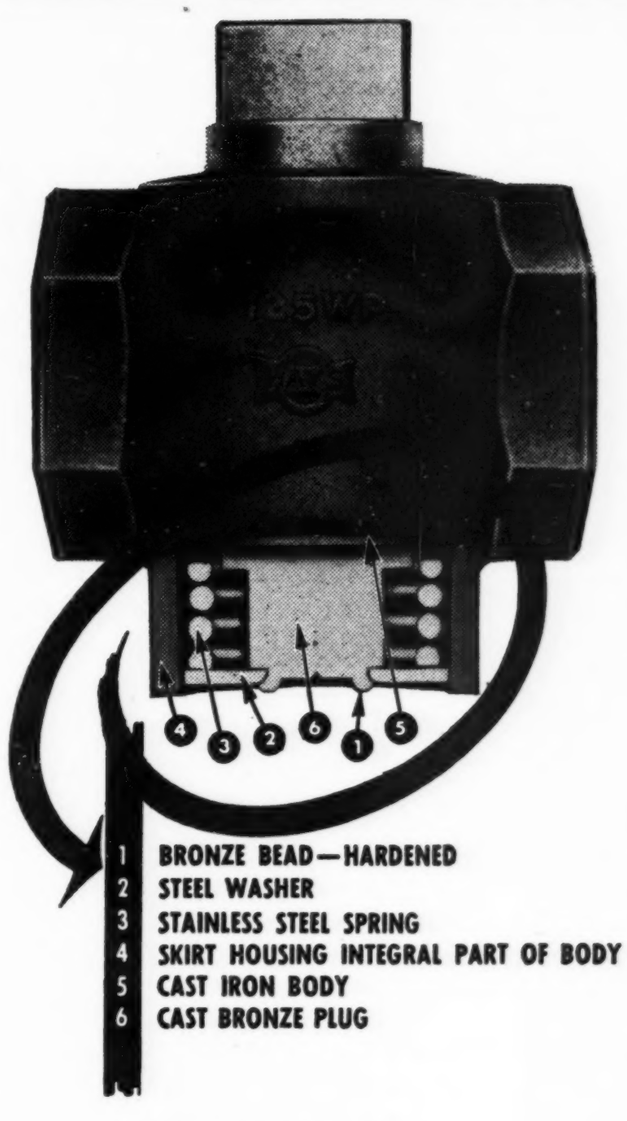
T. F. GIFFORD has joined Chattanooga (Tenn.) Implement & Manufacturing Co. as plant manager. Mr. Gifford was associated with the Norge Division of Borg-Warner for 12 years and served as manager of Norge's Chattanooga plant.

EDWARD J. McKEEVER has been appointed sales representative in the eastern middle Atlantic states for The G. S. Blodgett Co. Inc., Burlington, Vt. Mr. McKeever has been associated with The Brooklyn (N.Y.) Union Gas Co. for the past 10 years.

HAYS®

TAMPER-PROOF GAS STOPS

FEATURES


1 BRONZE BEAD—HARDENED
2 STEEL WASHER
3 STAINLESS STEEL SPRING
4 SKIRT HOUSING INTEGRAL PART OF BODY
5 CAST IRON BODY
6 CAST BRONZE PLUG

- Positive Tamper-Proof and Vandal-Proof Design.
- Non-Removable Plug—with Constant Spring Tension for 125# Working Pressure.
- Extra Grade Gray Iron Body, Gas Service Bronze Plug.
- Tough Stainless Steel Spring—Strong Steel Washer, Retains Plug in Body.
- Heavy Bronze Bead, Hardened—Holds Steel Washer to Bottom of Plug.
- All Assembly Parts Recessed and Inaccessible within Iron Body—Gripless and Shearless.
- Precision Ground Plug and Body—Matched for Perfect Seating.
- Lubricated with a Compound of Greases—Suitable for Use with Manufactured, Natural or Liquid Petroleum Gases.
- Spring Tension Allows Free Turning and Reseating of Plug in Body.
- Individually Tested Under Rigidly Controlled Inspection.
- Flow Way Equal to Rated Capacity of Domestic Consumer Meters.
- Obtainable in a Variety of Patterns.

Write for Folder 120-C

AVAILABLE IN

Black or Galvanized

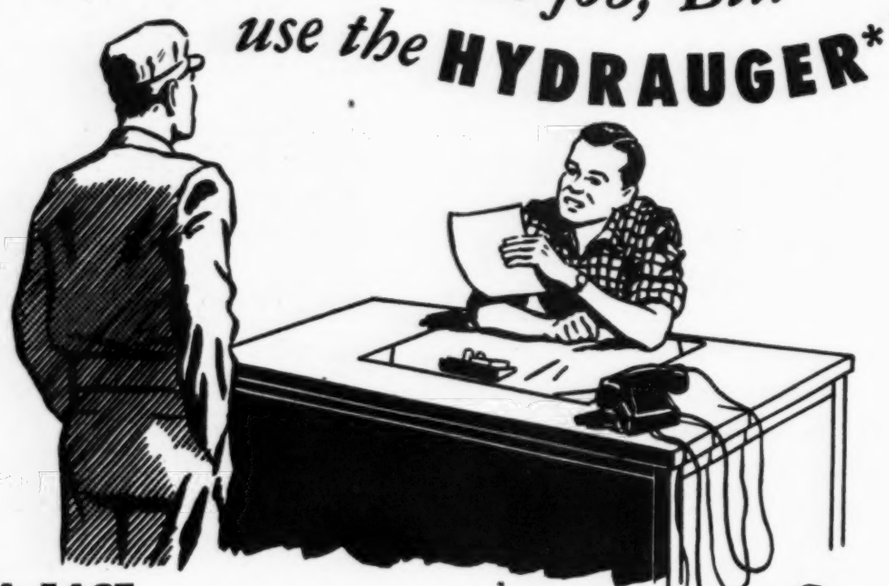
Flat Head Less Check
Flat Head With Check
Flat Head With Lock-Wing

Sizes; ¾"—1"—1¼"—1½"—2"

Also HAYS STANDARD
HEAVY PATTERN IRON BODY
GAS STOP

For 75 Years the Gas Industry has relied on HAYS Iron Body Gas Stops

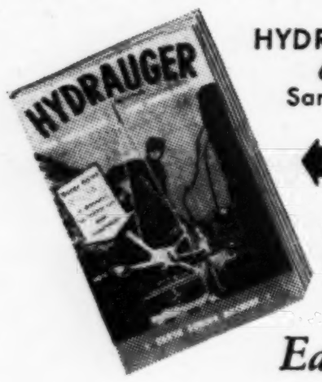
"... speed up that job, Bill — use the HYDRAUGER*"



IT'S A FACT

... on short runs (up to 200') underground pipe can be laid faster and at much less cost in Hydrauger BORED HOLES! (Bore diameters 2" through 24".)

operates by compressed air ... needs only a 2' 6" by 7' 6" trench.



HYDRAUGER CORP., Ltd.
681 Market Street
San Francisco 5, Calif.

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Earth Boring Tool

*Reg. U. S. Pat. Off.

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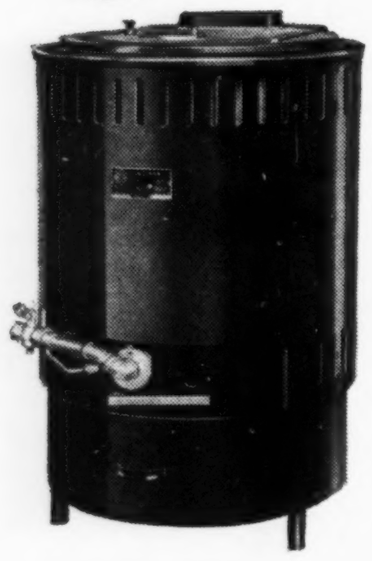


GAS-FIRED INCINERATOR

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

AGA APPROVED

BUILDS BASE LOAD

Plus

Much better than average
MERCHANDISING PROFIT

A "MUST" for homes with automatic heat—needed in every home. Commercial size also available.

INCINOR SALES MAKE FRIENDS FOR GAS COMPANIES

Write for details.

BOWSER, INC., INCINERATION DIVISION
CAIRO. ILLINOIS

IRON SPONGE

"CHOICE"

of the gas industry

With the demand for gas at an all time high, Iron Sponge answers the need for rapid flow and higher pressures in gas purification. Specify Iron Sponge for extra high capacity and activity ... longer periods between necessary recoverings ... fast, complete come-back after fouling ... low initial cost and low maintenance ... minimum operator attention. These are the advantages that have made Iron Sponge the choice of the gas industry for over 73 years.

Other Connelly products include:

CALOROPTIC. A simple, inexpensive instrument for continuous direct readings and BTU control of manufactured, natural, propane and butane air gas.

H2S TESTER. For quick, accurate tests using pre-tested paper discs.

CONNELLY, Inc.

3154 S. California Ave., Chicago 8, Ill.
Elizabeth, N.J. • Los Angeles, California

JAMES A. NORRIS has been appointed general sales manager of the brass division of Kerotest Manufacturing Co., Pittsburgh. He will be in charge of the company's brass valve and fitting sales, including refrigeration and LP-Gas products and compressed gas cylinder valves. Mr. Norris joined Kerotest in 1945 and has been serving as west coast district manager with headquarters in Los Angeles. He will now be in the Pittsburgh office.

CHARLES C. OWEN has been named manager of sales training for the Janitrol division of Surface Combustion Corp., Toledo. Since joining the organization in 1936, Mr. Owen has been in charge of the Cincinnati Janitrol district office.

PHIL R. BECKER, 10-year employee of Midwest Piping & Supply Co. Inc., St. Louis, has been appointed sales manager of the welding fittings division. Since 1945 Mr. Becker has devoted his time to this phase of the firm's operations.

HAROLD DUNCAN has been appointed assistant regional manager of Eutectic Welding Alloys Corp., New York City. Formerly district engineer in Texas, Mr. Duncan is now in charge of a group of district engineers in the Southwest.

- OBITUARIES -

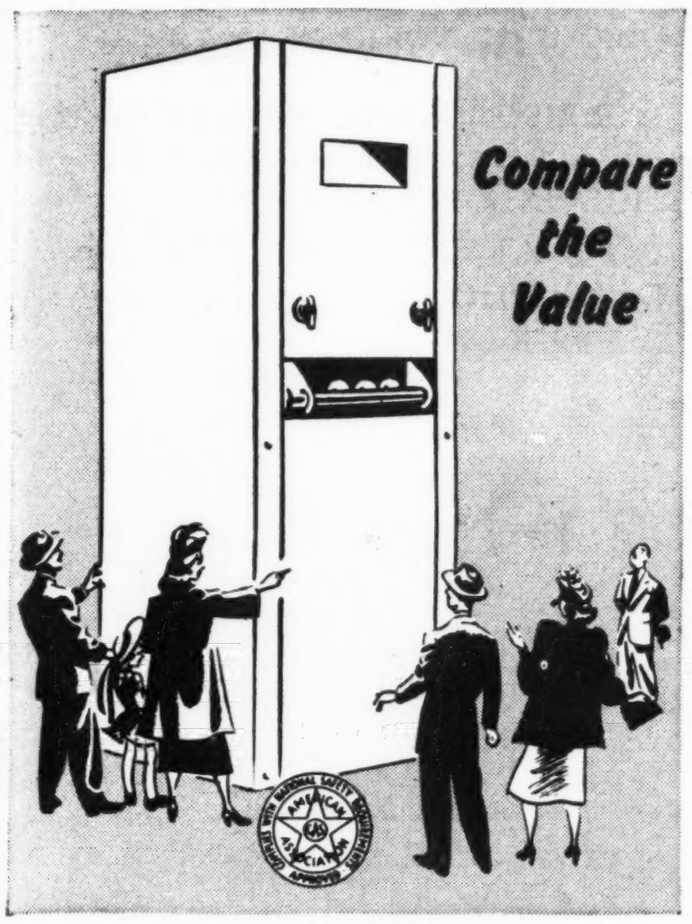
JACK P. DAVIDSON, Los Angeles gas appliance dealer, died Jan. 16 of a heart attack. Mr. Davidson was born in London, England, 69 years ago and had been in the gas industry on the Pacific Coast since 1911, serving as Pacific Coast manager for Estate Stove Co. for 20 years. He was an active member of the Pacific Coast Gas Assn. during his entire career.

HARRY G. WATERBURY, 81, who was associated for many years with the Stamford (Conn.) Gas & Eelectric Co. and with the Stamford division of Connecticut Power Co., died Jan. 3. He had retired in 1937 as secretary of the Stamford division but remained a member of the division committee until 1945.

CARROLL MILLER, 74, a member of the Interstate Commerce Commission since 1933 and former president of the Thermatomic Carbon Co., New York City, died recently in Washington, D.C. Mr. Miller had a long career as a consulting engineer in England, France, Germany and Japan before his appointment to the commission.

J. A. SCHALLENBERG, assistant comptroller, Worthington Pump & Machinery Corp., Harrison, N. J., died Dec. 16 after a long illness. Mr. Schallenberg joined the company in 1918 and served in the treasury and accounting departments both here and abroad.

JAMES E. O'HAGAN, 45, died Jan. 10 at San Marino, Calif. Mr. O'Hagan was associated with Robertshaw-Fulton Controls Co.'s (Youngwood, Pa.) Chicago office until in 1941 he moved to the Grayson Controls Division in Los Angeles. He was vice president of the division when he left it in 1947



NEW Hendy "60"

A giant in performance and value, a midget in size—that's the new Hendy "60," *made by the makers of the famous Henderson Clipper.* Only 52" high, by 18" x 30", the Hendy "60" fits in a small closet or corner. Yet it provides all the luxury of high-quality, blower-type central heating (with ducts) at a cost competitive with ordinary heating methods for smaller homes.

60,000 B.t.u. Input

- **VENT AT TOP, FRONT**— saves space and facilitates installation.
- **CLIPPER-TYPE, HENDERSON-DESIGNED BLOWER,** precision made in our own factory.
- **HIGH-EFFICIENCY HEAT EXCHANGER** Multi-stream principle, same as used in our Clipper and Clipperette.
- **EVERY UNIT FACTORY-ASSEMBLED** and tested in actual operation.
- **SPECIALIZED EXPERIENCE**—This new unit reflects many years' experience in manufacturing blower-type, gas-fired furnaces exclusively.

Write or wire for catalog-sheet, prices, dealer-opportunities

HENDERSON
FURNACE AND MFG. CO.
Sebastopol, California
CLIPPER · CLIPPERETTE · HENDY "60"

to become vice president of Allied Records Manufacturing Co. Inc.

RUSSELL C. FESSENDEN, 30, official of the North Penn Gas Co., Port Allegany. Pa., was killed in an automobile accident near that city on Dec. 23. Mr. Fessenden was supervisor of the company's house heating division.

EDGAR F. DAVIES, 68, who retired in 1946 as manager of the system operation department of Consolidated Edison Co. of New York Inc., died Dec. 20 in St. Petersburg, Fla.

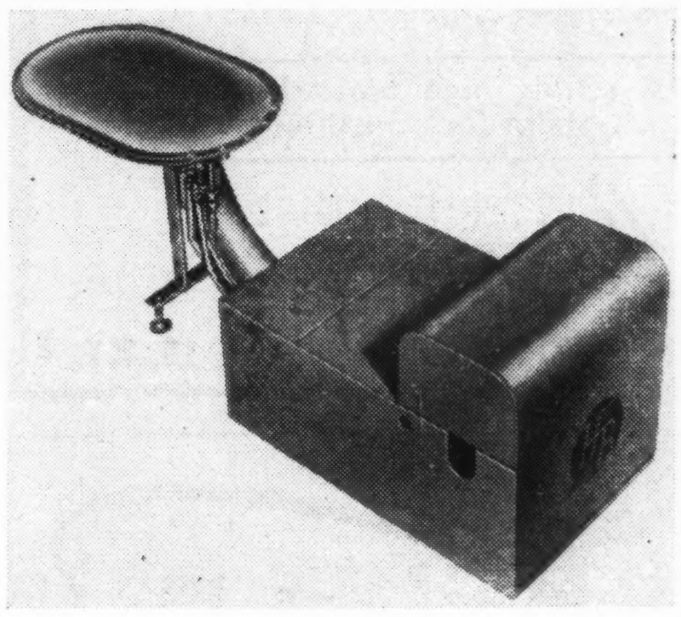
NEW PRODUCTS

Conversion Burner

HANDLEY-BROWN HEATER CO., Jackson, Mich.

MODEL: Ash pit gas conversion burner.

DESCRIPTION: This new line supersedes the firm's "R" and "S" series of ash pit burners. AGA-approved, the burners are equipped with either round or oval burner



heads for round or rectangular furnace or boiler firepots. Capacity of each burner is from 60,000 to 300,000 Btu. The burner utilizes the design of the company's "fuel door" burner, which permits the burner head to maintain uniform efficiency in a wide range of firepot sizes.

Welding Mask

GENERAL SCIENTIFIC EQUIPMENT CO., 2700 W. Huntingdon St., Philadelphia, Pa.

MODEL: Jackson BX shield.

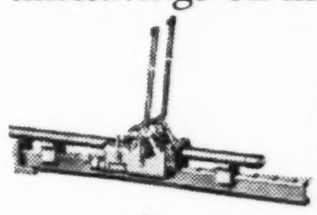
APPLICATION: Especially designed for gas welding, cutting, and brazing.

DESCRIPTION: Multiple adjustment assures proper fit, and this shield may be worn over prescription glasses. Headgear and cross strap over top of head are extruded plastic—moisture-proof, will not shrink or warp, and may be sterilized. Headgear pivot assembly is semi-permanent. Tension is locked in at the factory. Sturdy side protectors hold pivoted lens retainer made of opaque molded plastic. Standard size is 2 in. x 4⅛ in. Lenses are held securely in place, yet easily replaced.

CUT COSTS ON UNDERGROUND PIPING JOBS

...with a GREENLEE PIPE PUSHER

Installing pipe underground is quick and simple this way. With a GREENLEE Hydraulic Pipe Pusher *one man* pushes pipe through the ground—under streets, railways, walks, lawns, floors. Saves time, cuts costs through elimination of extensive ditching as just a short trench accommodates the Pusher. No tearing up of pavement, lawns, floors . . . eliminates tunneling, back-filling, tamping, repaving. Cuts job time to a fraction. Pusher often pays for itself through timesavings on first job or two.



No. 790 GREENLEE PUSHER
For 3/4 to 4-inch pipe. Six speeds—5,600 to 40,000 lbs. pushing pressure.

No. 795 GREENLEE PUSHER
For pipe larger than 4-inch, concrete sewer pipe, large drainage ducts. Six speeds—25,000 to 150,000 lbs. pushing pressure.

POWER PUMP For both sizes of GREENLEE Pushers. Pushes pipe at rate of two feet per minute.

TOOLS FOR CRAFTSMEN
GREENLEE

Get facts on timesaving Greenlee tools now. Write Greenlee Tool Co., Division of Greenlee Bros. & Co., 1942 Columbia Avenue, Rockford, Illinois, U.S.A.

NEW! Peerless
CIRCULATORS — RADIANT HEATERS
UNIT HEATERS — FAN CIRCULATORS
A.G.A. APPROVED FOR ALL GASES
NEW! 1950 MODELS NEW! SMOOTH FINISHES
NEW! eye appealing smart designs
NEW! quiet forced air circulation
NEW! positive automatic controls
NEW! seam welded gas tight heating sections
NEW! striking finishes — longer life construction
Styled to Sell — Built to Satisfy — Made to Last
Get ready NOW for 1950's best selling high profit line.
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20% MORE ODOR VALUE
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THE NATURAL GAS ODORANT
HAS BEEN PROVEN TO HAVE
20% MORE ODOR VALUE
THAN ANY OTHER KNOWN
ODORANT ON THE MARKET
UNIFORM VOLATILE
ECONOMICAL HARMLESS
TRUE GAS LIKE ODOR
SHIPPED PREPAID U. S. A.
DESTINATIONS
WRITE TODAY FOR OUR FREE BOOKLET
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EXPERTS IN
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CHANGE-OVER
SERVICE
LET our experienced gas conversion specialists save you time, cost and trouble on every gas change-over project — for natural, manufactured or LP-gas. Our comprehensive service includes:
★ Physical and Sales Potential Surveys
★ Engineering and Construction Changes
★ Appliance and Equipment Adjustments
★ Public Relations Planning
AMERICAN GAS CONVERSIONS, INC.
AGC
ROCKEFELLER CENTER
630 FIFTH AVENUE
NEW YORK 20, N. Y.
A SUBSIDIARY OF
PACIFIC GAS CORPORATION

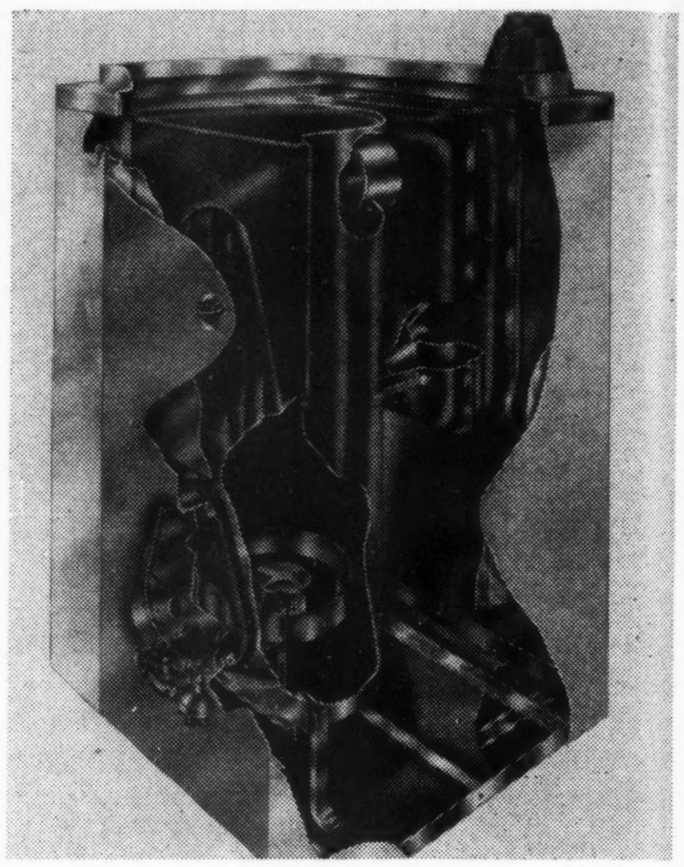
Gravity Furnace

MORRISON STEEL PRODUCTS INC., 601 Amherst St., Buffalo 7, N. Y.

MODELS: GR-2-G and GR-3-G.

APPLICATION: For domestic heating.

DESCRIPTION: This Mor-Sun gas burner is a single port, non-clog type with a fixed orifice and venturi-tube design. It produces



a semi-luminous, full-floating convex flame. Completely automatic, it comes equipped with solenoid valve and safety pilot, pressure regulator, main shutoff and pilot shutoff valves, thermostat and draft diverter. Constructed of heavy-gage steel and welded seal-tight, there are no hot or cold spots, the manufacturer states.

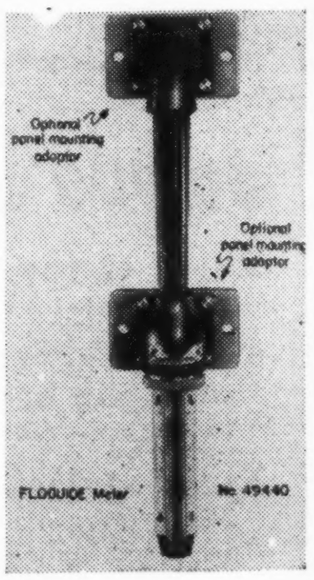
The GR-2-G (illustrated) has a Btu input of 80,000; Btu input of the GR-3-G is 110,000.

Flowmeter

FISCHER & PORTER CO., Hatboro, Pa.

MODEL: Floguide.

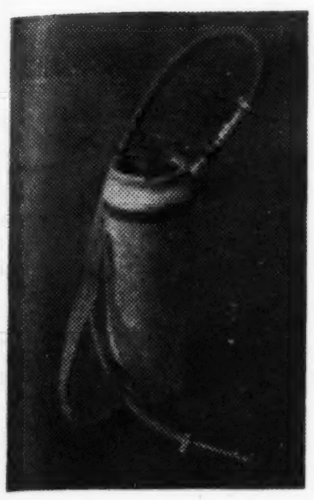
APPLICATION: For the measurement of gas flow rates.



DESCRIPTION: Metering elements are made of corrosion-resistant stainless steel. The metering tube is welded to become an integral part of the inlet and outlet fittings permitting simplified panel installations because piping requirements are reduced to a minimum. The sight extension is arranged to allow widest possible visibility, and a stiffener rib is placed in front of the indicator tube to eliminate danger of damage to the instrument.

The Floguide is available in capacities from 45 to 16,000 standard cu ft of CO_2 per hour, 200 to 76,000 scfh of hydrogen, and similar capacities for other gases. Although primarily designed for low pressure service, meters can be furnished to withstand 600 psig in all sizes.

Service Cleaner



SUPERIOR METER CO. INC., 167 - 41st St., Brooklyn, N. Y.

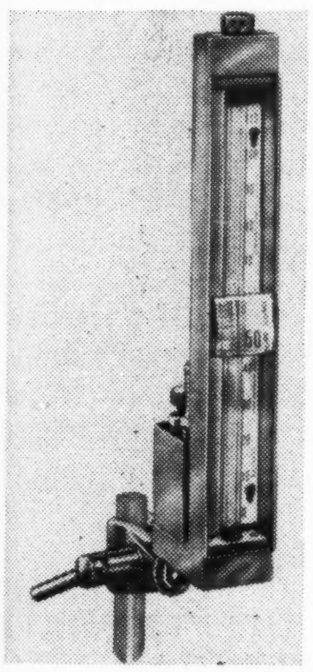
APPLICATION: For use during cold weather to open up frozen service lines.

DESCRIPTION: This device forces either alcohol or air into service lines under pressure and is equipped with automatic shutoff. The 4-gal tank is electrically welded steel, hot dip galvanized after forming to increase its resistance to corrosion. It has a 5-in. open top to permit easy filling and cleaning. The bayonet-type locking cap has a safety locking lever which prevents removal of the top while pressure remains in the tank. The 2-in. seamless brass pump features a self-adjusting tapered valve stem. A 5-ft length of hose with connections and a convenient carrying strap are included.

Portable Manometer

THE MERIAM INSTRUMENT CO., 10920 Madison Ave., Cleveland 2, Ohio.

MODEL: Portable field manometer.



APPLICATION: For checking calibration of gas orifice meters in the field.

DESCRIPTION: This instrument, which weighs only 3¾ lb, is provided with bubble level and universal ball and socket type clamp for mounting to meter piping. Mercury and a length of rubber tubing are provided, as well as a metal case to facilitate carrying. The assembly housed in this case weighs 7½ lb.

The manometer is built of stainless steel with precision bore tubing. As shown in the illustration, it has a sliding magnifier which is good for readings down to 0.2 in. of water. The scale is graduated in inches of water pressure, using mercury, calibrated dry. The range is from 0 to 110 in. of water. A valve at instrument well and fitting at top of indicating tube prevent loss of mercury when manometer is transported.

Magnetized Level

THE BUCKEYE PLASTIC CORP., 740 Superior Ave. N. W., Cleveland, Ohio.

MODEL: Magno-Level.

APPLICATION: For steamfitters, plumbers, welders, and construction and maintenance men who work with ferrous metals.

DESCRIPTION: This combination level and angle indicator will stick to a pipe or any piece of ferrous metal, leaving the worker's hands free for line-up, straightening, or fastening work in place. Equipped

SALES ENGINEER

Splendid opportunity for graduate engineer — 30 to 35 years of age — with a large midwestern manufacturer of controls. Must have sold mechanical or electrical equipment, preferably to manufacturing accounts. This man will receive a few months training and be assigned a sales territory. This is a salaried position. Fee paid by employer. Call, write or wire in confidence.

B. T. BADGLEY

Cadillac Employment Agency, Inc.

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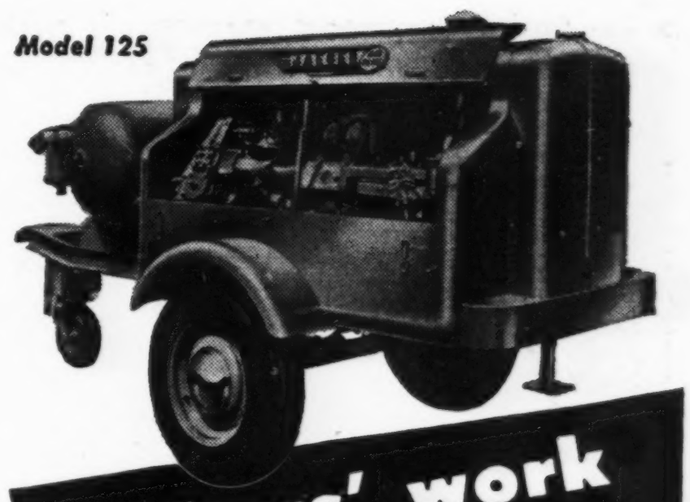
Model 125



4 days' work now done in 3

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Jaeger Model 125 runs 2 heavy duty or 3 medium breakers at full 90 lbs. pressure, doing 30% to 40% more work than at 70 lbs. pressure from a 105 ft. machine.

Other Jaeger "new standard" sizes, 75, 185, 250, 365, and 600 ft., give you comparable work increases. Cost no more than smaller old sizes. Send for Catalog and prices.

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Columbus 16, Ohio

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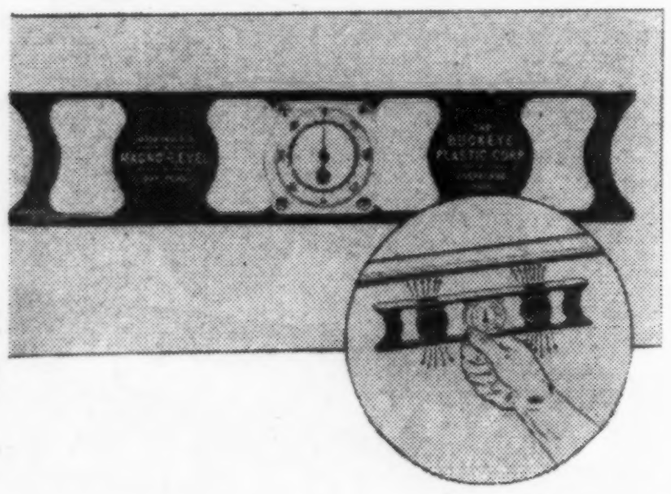
with Alnico permanent magnets, it will adhere to round or flat surfaces at any angle.



A clock-faced angle gage with balanced gravity needle rotates on newel bearings and determines any angle from 0 to 360°.

The frame is a special alloy aluminum of high tensile strength. It measures 9 in. x 2 in. and weighs 10 oz. List price is $5.95 f.o.b. Cleveland.

Electrode

EUTECTIC WELDING ALLOYS CORP., 40 Worth St., New York, N. Y.

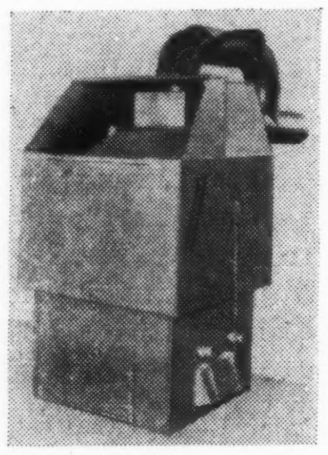
MODEL: Steel-Tectic electrode.

APPLICATION: For welding bead over bead without the need for removing slag.

DESCRIPTION: This high speed 5/32-in. electrode can be used at as low as 50 amps on thin steel without danger of burning through. Distortion is reduced and it is economical because heavier, less expensive rods may be used. For piecework production, Steel-Tectic can be run fast at high amperages, as a thin depositing electrode with a very short arc.

Newly developed FrigidArc flux coating is responsible for Steel-Tectic's performance. It forms a protective envelope around the weld area, permitting a spray deposit free of weakening oxides and inclusions. It is unnecessary for the welder to brush or chip away the slag; he welds right over the previous pass. Elimination of chipping constitutes a safety factor, since there is no danger to the welder's eyes.

Incinerator



RAMSEY - BENNETT CO., 430 Huron Road, Cleveland, Ohio.

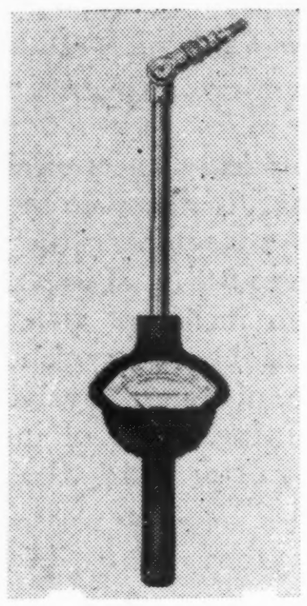
MODEL: Winnen CB-20.

APPLICATION: For use in hotels, restaurants, stores, factories, apartments, schools, and institutions.

DESCRIPTION: Constructed of heavy gage bonderized steel, this incinerator has a 20-bu capacity combustion chamber lined with fireproof Haydite slabs. The company states that the unit consumes 400 lb of 50% moisture content garbage or trash per hour. The patented twin-burner mechanism provides a hot flame with natural, manufactured or LP-Gas. A forced-draft and ventilating system, powered by a ⅓ hp electric motor and squirrel-cage blower fan, insures complete dehydration and combustion and eliminates smoke and odor.

Designed for continuous or intermittent operation, the unit may be ignited either manually or with a continuous pilot flame. Height is 84 in., width 41 in., and length 41 in.

Pyrometer



THE PYROMETER INSTRUMENT CO. INC., Bergenfield, N. J.

MODEL: Pyro surface pyrometer.

APPLICATION: For determining surface and sub-surface temperatures in industrial plants or laboratories.

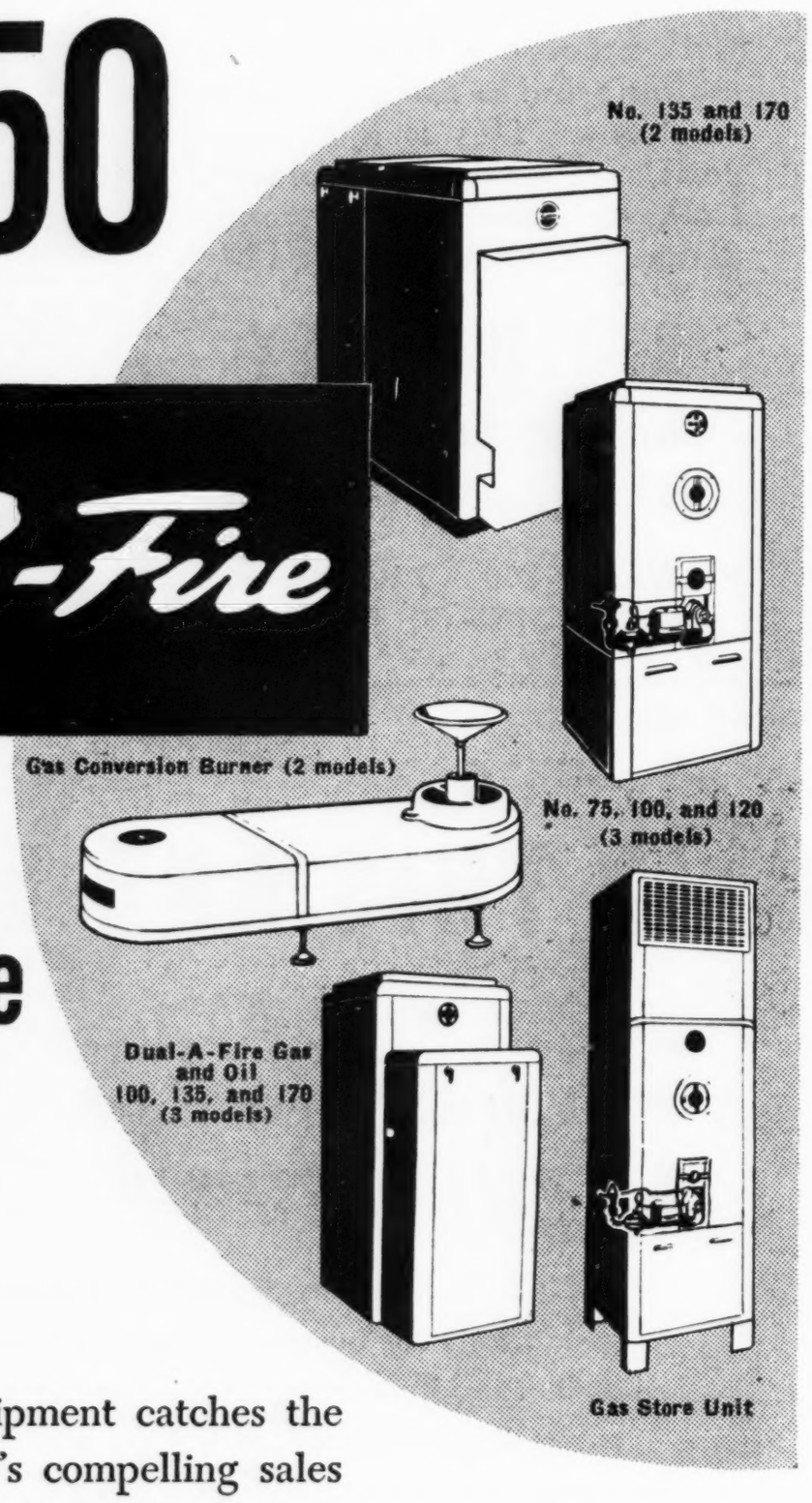
DESCRIPTION: This instrument features a large 4-in. direct reading indicator mounted in a rubber cushioned housing. Two series of models offer either a rigid extension arm or a 42-in. flexible arm suitable for use with any one or more of a selection of eight types of thermocouples. Each series is available in four temperature ranges from 0-400°F to 0-1200°F, and all thermocouples may be interchanged without adjustment or recalibration.

Catalog No. 180 describes and illustrates this instrument, and it may be obtained from the manufacturer.

ready for '50

Gas-A-Fire

America's truly complete line of gas firing equipment



Gas-A-Fire's all-white equipment catches the customer's eye. Gas-A-Fire's compelling sales story does the rest. No lost sales, either, when it comes to size. Gas-A-Fire's full range of forced warm air furnaces and conversion burners meet practically every need.

Have the Gas-A-Fire line on your floors in time for the record demand due to break in your territory soon. Write, wire, or phone today.

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ROOM COOLERS

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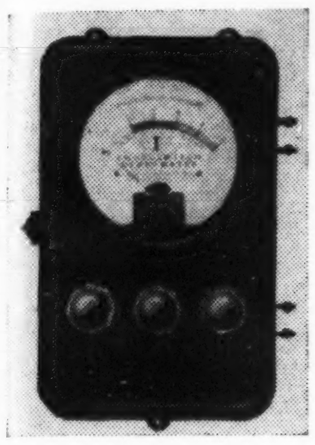
Automatic Heating & Cooling Firing Corp. 4417 OLEATHA ST. LOUIS 16, MO.

Smoke Density Indicator



PHOTOSWITCH INC., 77 Broadway, Cambridge, Mass.

MODEL: Excess smoke indicator type 2A10C.

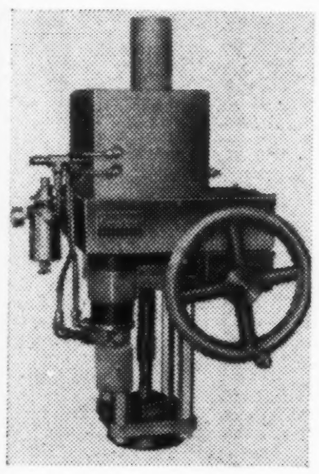
APPLICATION: Designed for use in factories, public utilities, commercial power plants, and all types of institutions.

DESCRIPTION: This device gives a continuous indication to the boiler room of the condition of gases which are passing through the flue, signalling when either smoke or air is sufficiently excessive to cause inefficient combustion or create a smoke nuisance.

The indicator consists of three pieces of equipment — photoelectric control, light source, and densometer. The photoelectric control includes a phototube and electronic amplifier which operate a dual relay system and indicating meter in the densometer. A beam from the light source projects from an opening in the flue to the eye of the control.

A tamper-proof sensitivity adjustment on the photoelectric control is set upon installation to compensate for flue dimensions and other variables.

Power Operator



CONOFLOW CORP., 2100 Arch St., Philadelphia 3, Pa.

MODEL: Rotomotor.

APPLICATION: For use on valves, dampers and other control devices.

DESCRIPTION: This power operator employs a reversible pneumatic motor and gear driven screw stem. It combines the features of a self-locking stem with continuously connected handwheel, extreme sensitivity, and compact size. Advantages claimed by the manufacturer include accurate positioning to within 1/500th part of stem travel, sensitivity to instrument changes as low as .025 psi, high stability, stem loads up to 10,000 lb, stem travel up to 20 in., stem speeds up to 12 in. per minute, and adaptability to any type of heavy duty throttling control application.

CATALOGS

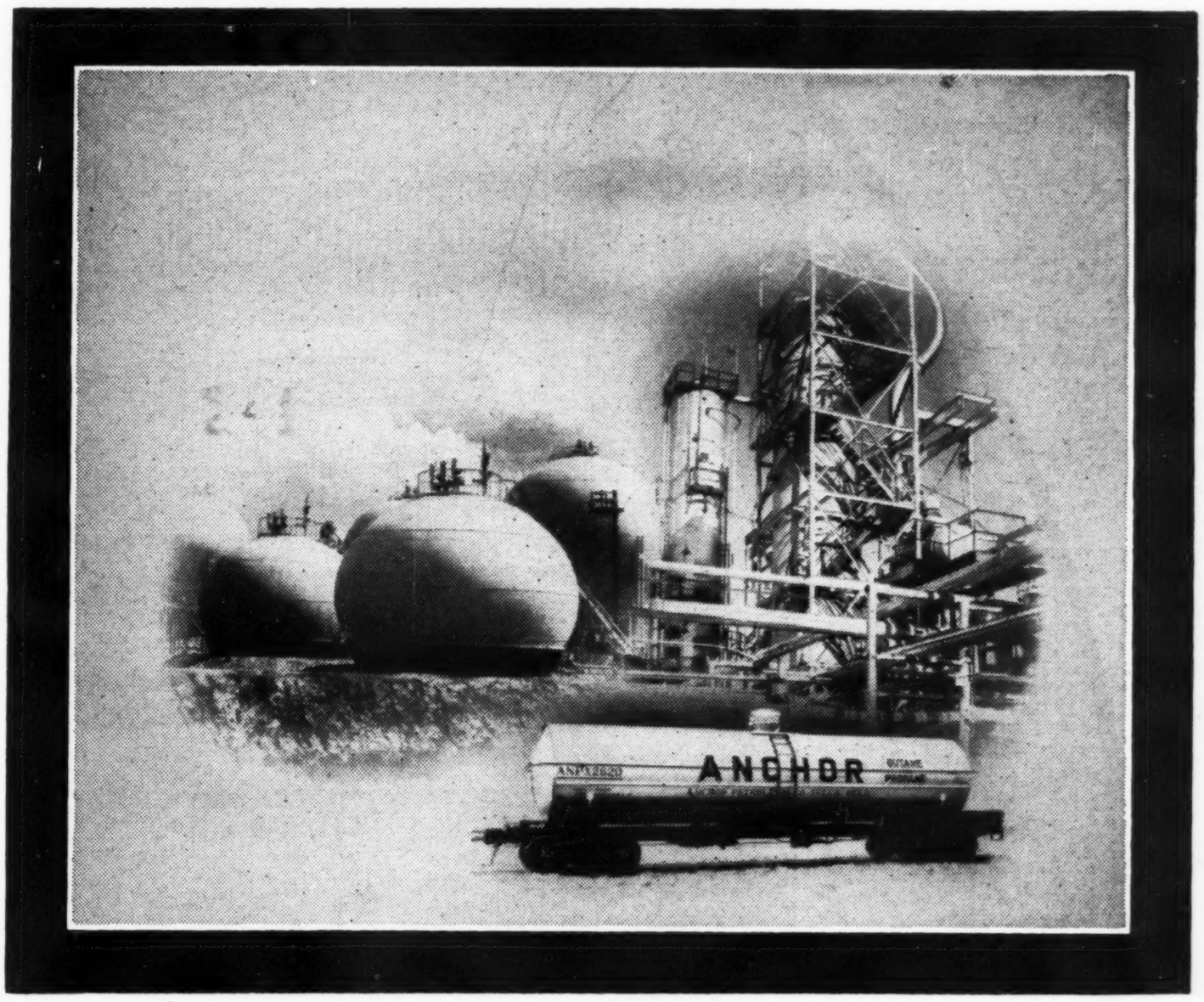
MIDWESTERN ENGINE & EQUIPMENT CO. INC., 105 N. Boulder, Tulsa, Okla.—A four-page brochure on the properties, uses and costs of Kapco Rock Shield, a mastic composition board designed to protect pipe and coating from rock and other cutting or scraping surfaces, was issued recently. An estimating table enables the pipeline contractor to compute in advance the exact cost for protecting the pipe he has contracted to lay. Kapco Rock Shield is manufactured by Keystone Asphalt Products Co., a division of American-Marietta Co. of Chicago. Exclusive distribution is by Midwestern of Tulsa.

BAKER & CO. INC., 113 Astor St., Newark 5, N. J.—A new four-page folder describes this company's Nitroneal generator for producing pure nitrogen with a controllable hydrogen content. The generator uses the Engelhard process for the simultaneous catalytic oxidation of ammonia and the controlled reduction of the hydrogen content to between .2% and 40%. The bulletin includes tables of gas ratios and ratings and a flow diagram.

LOCKWOOD, KESSLER & BARTLETT INC., 32 Court St., Brooklyn 2, N. Y.—"Wings for the Transit" is the title of a brochure which explains basic principles of techniques employed in producing aerial topographic maps. The publication shows various stages in the preparation of accurate maps from precision aerial photographs. Samples of such photographs, stereoscopic pairs, mosaics, and photogrammetric maps are included.

HAGAN CORP., Hagan Bldg., Pittsburgh 30, Pa.—Bulletin M-51 explains how automatic compensation for pressure or temperature variations, or both, are achieved in flow measurement of gases, liquids or other fluids with Hagan compensated ring-balanced meters. A schematic diagram shows how a corrected record is automatically and continuously produced, with the chart also showing uncorrected flow. A built-in integrator automatically totalizes the corrected flow.

DOWELL INC., Tulsa 3, Okla.—Dowell magnesium anodes for control of corrosion on underground and submerged structures are described in a fully illustrated catalog issued recently. Included are sections on applications, design, installation, and predict-



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LP-Gas for: Stand-by Plants - Peak-load Demands - Industrial Plants - Cities and Towns

From our strategically-located plants we are able to give quick delivery on high-quality ANCHORGAS, Butane-Propane. Shipments by rail, water, or transport. For dependable gas service, call us before you renew your contract. Ask about Anchor's special contract.

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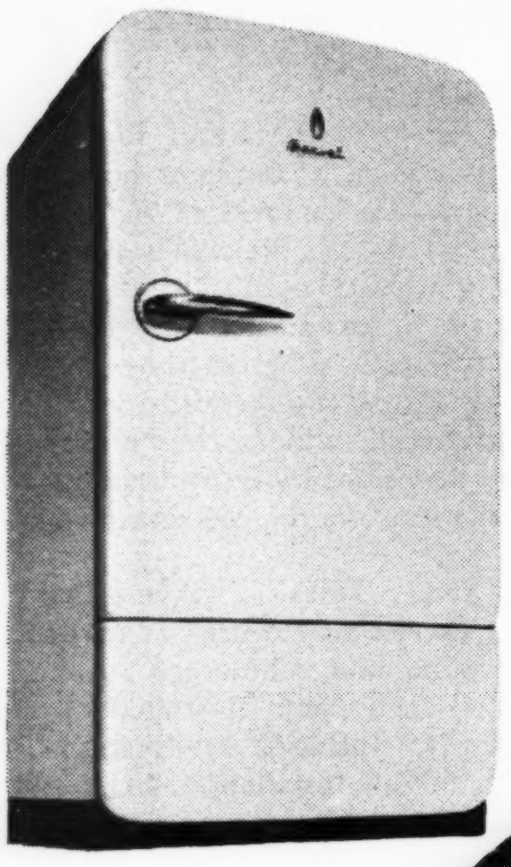
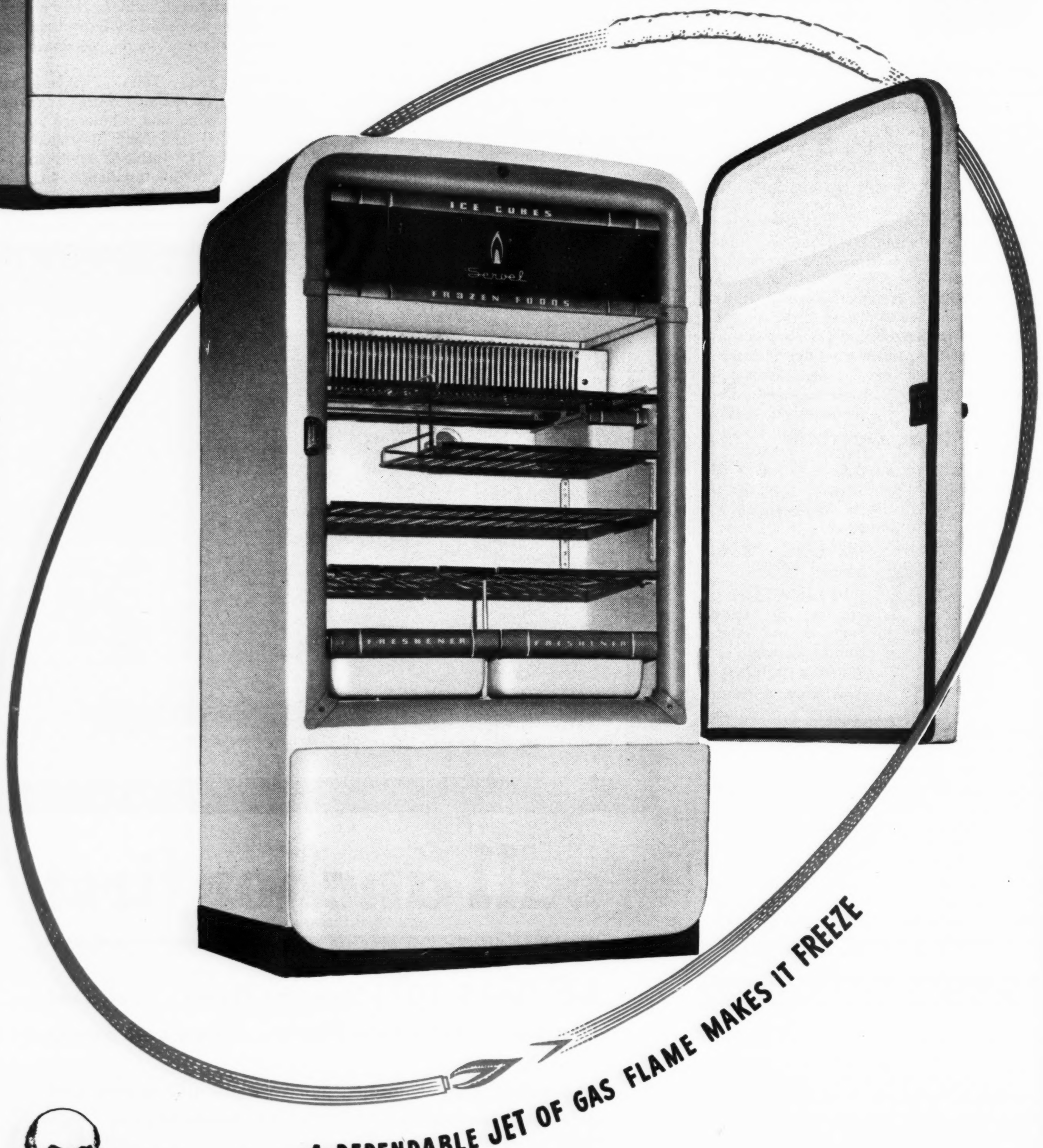


The NEW



A DEPENDABLE JET OF GAS FLAME MAKES IT FREEZE

DESIGNED BY WALTER DORWIN TEAGUE, LEADING INDUSTRIAL DESIGNER,

Greater Servel

Beautiful LONG-LIFE DESIGN

Amazing QUICK-CHANGE INTERIOR

Plus the only freezing system that STAYS SILENT, LASTS LONGER

You can't miss in '50 with the *exciting new* Servel! Never before have homemakers been offered a refrigerator with so many advantages!

Servel for '50 has a new Long-Life Design! Its classically simple exterior is styled to *stay* modern—never to "date" a kitchen.

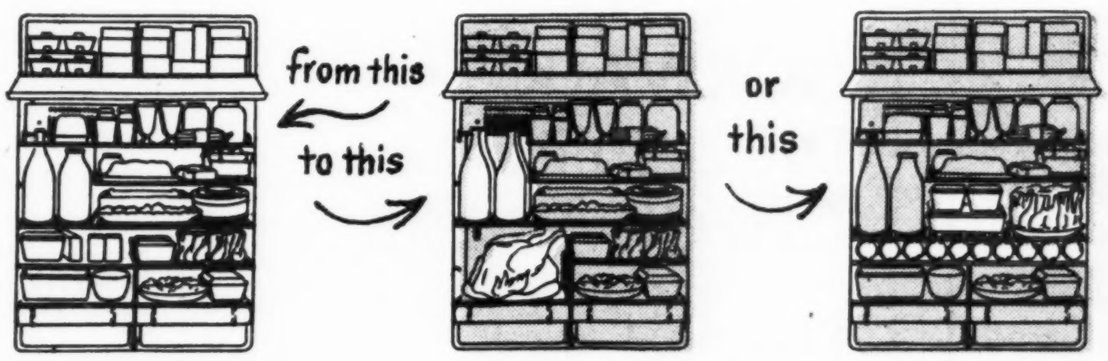
Servel for '50 has a new 90-Second Quick-Change Interior! Shelf arrangements are *easily* and *quickly* adaptable to all family needs.

Servel for '50 has every modern convenience! Big clear-across frozen food compartment! Large easy-to-remove ice cube trays! Big, roomy fruit and vegetable fresheners! Handy egg tray! Lots of tall-bottle space! Seamless exterior in lustrous Newtone!

Servel for '50 has famous JET FREEZE! No moving parts! A tiny jet of gas flame does all the work! So *only* with Servel can Mr. and Mrs. American enjoy a refrigerator that *stays silent, lasts longer.*

And . . . backing up Servel for '50 is a huge battery of attention-getting, hard-hitting ads to pre-sell your market! So get set for big profits with this finest of all refrigerators . . . *the Great New Servel—sell-bent for '50!*

IT TAKES ONLY 90 SECONDS TO CHANGE SHELF ARRANGEMENT



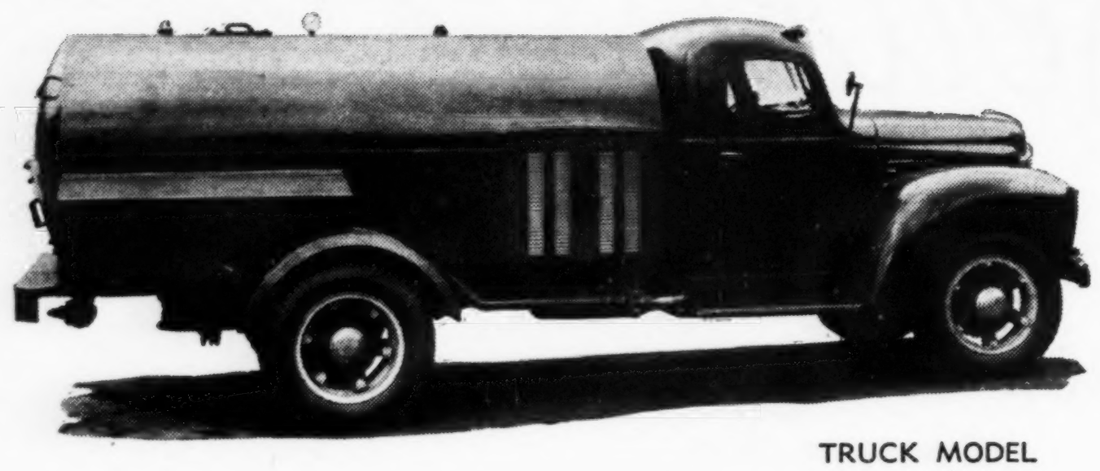
Whether it's a turkey for the holidays or a case of cokes for a party, it's quick and easy to arrange plenty of room with Servel's 90-Second Quick-Change Interior.

Servel

THE *GAS* REFRIGERATOR

PROMOTED WITH THE MOST DRAMATIC, STIRRING ADVERTISING IN REFRIGERATOR HISTORY

CLEAN DRIPS FASTER



TRUCK MODEL

With a Whittington Hydro-Scavenger, you can remove condensate from drips and open clogged service leads in less time . . . and with less manpower. Cleans drips up to 30 feet deep . . . loads and unloads up to 100 gallons a minute! Requires only one man to operate. Creates 27" Hg. vacuum for loading; 20 pounds pneumatic pressure for unloading—to overhead tank, if desired. Available in truck, trailer and skid models, powered by two-cylinder gasoline engine. Truck model also available with power take-off drive. Collection capacities from 300 to 1,000 gallons.

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FREE! **Write today for Bulletin HS-49 which describes how the Hydro - Scavenger can save time and money for you.**

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DISC TYPE
CHECK VALVE

Flanged and
Fabricated in Steel

For *GAS* and *AIR*—
LOW* and *HIGH PRESSURES

Can be supplied for use with any pressures. Easily lubricated through grease fitting. Indicator shows position of disc. Can be counter balanced for vertical jobs. Dash pot can be installed to prevent chattering when passing high velocity gas or air.

NORWALK VALVE CO.
South Norwalk, Conn.

ed results. Such problems as current required, number of anodes needed, which anode to use, and where to locate them are discussed.

FISCHER & PORTER CO., Hatboro, Pa.—Catalog No. 50 describes a variety of primary and secondary flow instruments and control valves. Included are variable-area primary flow meters; frictionless, series-resonant circuit electrical transmitters; Rato-matic flow rate recorders, controllers, and ratio controllers; Rato-Count totalizers; Accuro-Batch control systems; and Magna-Bond Flowrator direct-connected recorders, controllers, and pneumatic transmitters.

SELAS CORP. OF AMERICA, Philadelphia 34, Pa.—Bulletin SC-2.1, "Selas Combustion Controllers," discusses in detail these devices for controlling and accelerating gas-air combustion in heat processing. The catalog states that by bringing under control as many as possible of the factors which have caused variations in gas-air ratios and delivered mixture pressures, the controller has brought stability to combustion reactions.

AIR REDUCTION SALES CO., 60 East 42nd St., New York, N. Y.—A new catalog sheet describes the 200-amp. Hornet "special" arc welder. This machine combines the firm's 36A generator (a two-bearing unit) with a 4-cylinder, 31-hp air-cooled Wisconsin engine. The assembly is rigid, with a skid type base. A lifting eye is provided on top, and a full length, drip-proof canopy is included.

FISHER GOVERNOR CO., Marshalltown, Iowa—Two new regulator assemblies for the LP-Gas industry have been announced. The Uni-Matic Type 965 is a two-cylinder automatic changeover regulator for loads up to 195,000 Btu per hour. The Type 912Y-1850 two-cylinder cross tee check valve assembly has a load rating of 125,000 Btu per hour. Both are described on a new catalog sheet.

TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago, Ill.—Bulletin 485, "Corrosion Service Piping," discusses stainless steel and nickel alloy anti-corrosion and anti-contamination piping. Economics, standards, advantages of welding, technical data, design tips, and dimensional information on stainless fittings and flanges are included.

CURRENT READING

THE DETERMINATION of Low Concentrations of Hydrogen Sulfide in Gas by the Methylene Blue Method—by A. E. Sands, M. A. Grafius, H. W. Wainwright, and M. W. Wilson. This is a report of investigations by the Bureau of Mines, U. S. Department of the Interior. Summary and conclusions follow:

1. As little as 0.00001 grain of sulfide sulfur per 50 ml. of solution can be detected by the methylene blue tests. This amount of sulfur is equivalent to 0.001 grain per 100 cu ft when the gas sample is 1 cu ft.

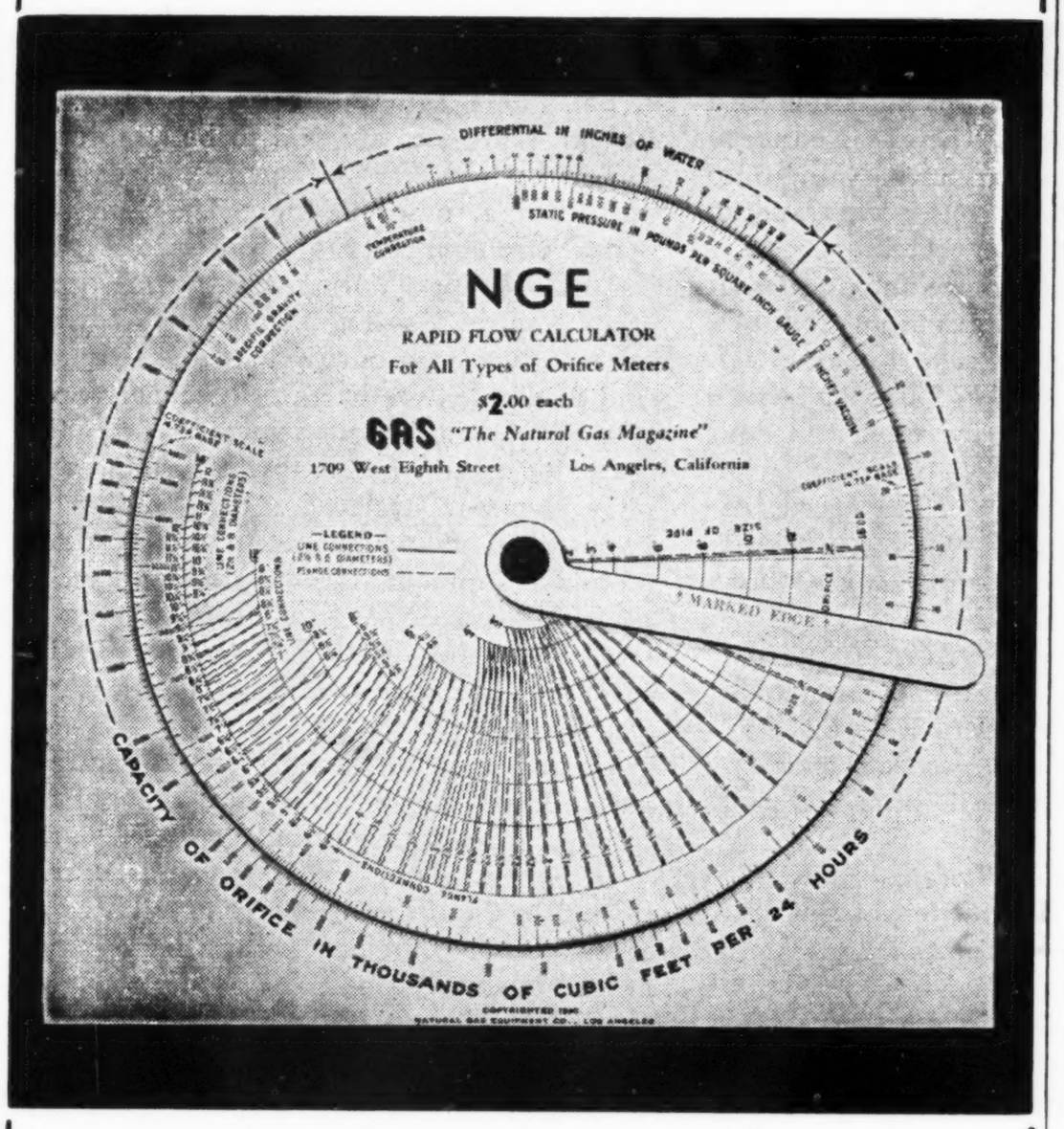
2. The reproducibility of this test applied to identical samples is ±0.000005 grain of sulfide sulfur per 50 ml. of solution.

3. This test has been applied to synthetic mixtures of carbon monoxide and hydrogen from cylinders. A limited number of tests on

NGE RAPID FLOW

CALCULATOR

FROM 2 inches TO 16 inches


DIFFERENTIAL IN INCHES OF WATER
STATIC PRESSURE IN POUNDS PER SQUARE INCH GAUGE
NGE
RAPID FLOW CALCULATOR
For All Types of Orifice Meters
$2.00 each
GAS "The Natural Gas Magazine"
1709 West Eighth Street Los Angeles, California
—LEGEND—
MARKED EDGE
CAPACITY OF ORIFICE IN THOUSANDS OF CUBIC FEET PER 24 HOURS

. . . will quickly compute any of a series of variables in the transmission of natural gases.

SIMPLE to operate: Set dial . . . Turn indicator . . *and instantly find*

1 COEFFICIENT and VOLUME
2 CORRECT ORIFICE SIZE IN ANY GIVEN VOLUME
3 DIFFERENTIAL PRESSURES

Our NGE CALCULATOR has been tested in field and desk use. Why not let it *help you* with your daily problems. If interested send in coupon and you will receive our calculator in a few days.

G A S **$2.00 EACH**
198 South Alvarado St., Los Angeles 4, California **25% discount on all orders for 25 or more**

Gentlemen: Please send me.....NGE *Gas Flow Orifice Calculators* for which I am enclosing my check or money order for $..... *Add 3% sales tax in California.*

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Utility
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"UC-1" Thermostat

"V-1" Valve

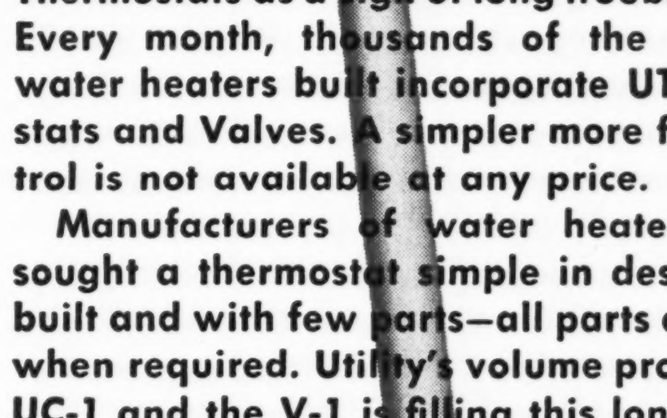
Certified by

FOR FOOL-PROOF SIMPLICITY

Plumbers and Appliance Dealers everywhere welcome the trademark on their Water Heater Thermostats as a sign of long trouble-free service. Every month, thousands of the most popular water heaters built incorporate UTILITY Thermostats and Valves. A simpler more fool-proof control is not available at any price.

Manufacturers of water heaters have long sought a thermostat simple in design, ruggedly built and with few parts—all parts easily serviced when required. Utility's volume production of the UC-1 and the V-1 is filling this long felt need.

Our 20 years experience in building gas controls PLUS our SERVICE policy that GUARANTEES complete satisfaction is assurance to Water Heater manufacturers, jobbers, dealers and the home owner of the finest in service and dependability.



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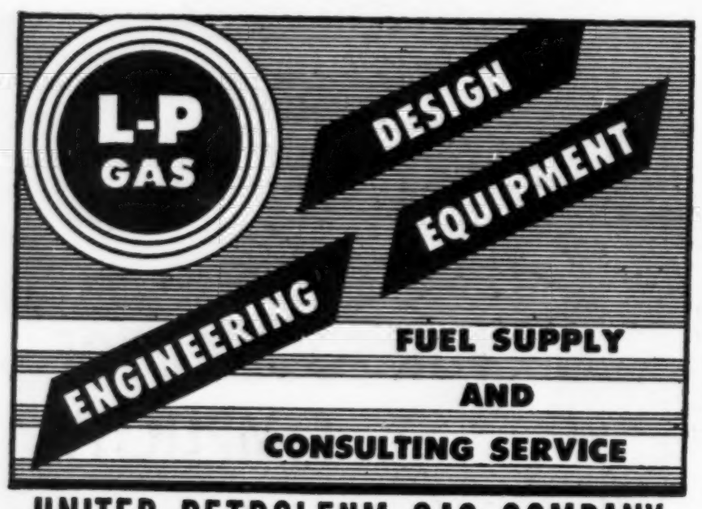
Classified advertising is set in 6-point type, without border or display, at the rate of 15 cents per word per insertion; minimum charge per insertion $3. Box numbers for replies count as 5 words. Count as a word each one letter word and each group of figures. Classified advertising is only accepted when payment accompanies order. Copy and payment must reach publisher's office prior to 10th of month preceding publication.

LP-GAS SPECIALISTS—100% PLANTS—STAND-by—Enrichment—Peak Shaving. Twenty years experience. H. Emerson Thomas and Associates Inc., Westfield, New Jersey.



UNITED PETROLEUM GAS COMPANY
806 ANDRUS BLDG., MINNEAPOLIS 2, MINN.

WHILE COALMEN WAIL, OILMEN FLAIL

Gas Takes Over the Heating Load

NATURAL gas' chief competitors for space heating load in the Northeastern United States are worried — very worried.

That fact, in itself, is not news. Oil and coal interests have long been worried—ever since long-distance transmission lines started shooting gas around the nation and John L. Lewis began pulling his famous stunts. But their worrying has come to a head in recent weeks, as their own editorial writers and spokesmen have swung into action to warn their constituents and to slug it out with this new threat.

Anthracite interests make no bones about their deep concern. Here are some statistics, quoted from the Anthracite Institute *Bulletin,* published in Wilkes-Barre, Pa., which demonstrate the basis for their collective brow-wrinkling:

As reported by the 1940 census of housing, there were 279,968 gas-heated homes in the states comprising *anthracite's primary marketing area.*

As reported by the AGA in its national survey of gas utility companies, as of May 1, 1949 there were 627,937 gas heated homes *in this same territory.*

That's an increase, in nine years, of 347,969 units—118%!

The outlook, the *Bulletin* showed, is equally dim—for anthracite. In this identical area—anthracite's *primary* marketing area—during the current season, 131,963 gas heating installations are being made. That adds up to another 47% increase over the 1940 figure.

Included in the area are the New England states, plus New York, New Jersey, Pennsylvania, Delaware, Maryland and District of Columbia.

The institute does find solace, however: since western Pennsylvania is traditionally a gas heating territory, estimates for current sales in this area were deducted, leaving a net for the market area of 100,000. And not all of those 100,000 will be conversions; two-thirds will probably be new installations. Still, they *might* have gone to coal.

No matter how you figure it, coal has a right to be—and is—concerned about conditions in its own back yard.

The *Wall Street Journal* last month reported contractors were "turning their backs on coal furnaces and John L. Lewis." A Massachusetts contractor "couldn't remember" when last a coal furnace was installed in his neighborhood. A Long Island builder didn't think 10% of the new homes were being coal-heated.

The Department of Commerce learned that in the first nine months of 1949, coal furnace shipments were off 45%; gas up 41%, oil up 9%.

But where natural gas is available, oil furnace sales, too, are said to be slipping.

The oil industry, meanwhile, is doing less wailing, more flailing. The Empire State Petroleum Assn.'s publication *Espa,* published in New York, raised the question "Can Natural Gas Fuel a National Emergency?" Pointing out the possible disruption of the delicate balance in refinery operations if heating oil demand skids, the magazine asked whether this is wise in case of another war. Defense, it held, is of first importance. Being unable to fuel planes, mobile equipment, farm equipment, etc., gas could not do certain jobs that petroleum does; this "lack of flexibility" indicated to *Espa* that a national fuel policy was in order.

Hopefully, it suggested that the natural gas industry might investigate the possibility of chemical applications.

In New England, Joseph B. Wells, executive director of the Independent Oil Men's Assn. of New England, swung back hard at threatened invasion. The people of New England are being "sold a bill of goods" by the "foreign gas transmission corporations and foreign-owned and controlled gas utility corporations," he charged.

He said:

Natural gas will bring no savings in home heating costs.

Natural gas would bring no savings for industrial users if sold on any "sound basis of economic competition."

A mixture of 25% natural with 75% manufactured represents the "logical expectancy" because of equipment change-over expense.

The volumes proposed for import would total four times any "normal historical gas requirements of the area" (when added to existing manufacturing facilities). It would be more than 10 years before this could be absorved.

Finally, he picked up *Espa's* line:

What would happen if the lines failed in wartime?

coke oven gas, carburetted water gas, and blue water gas indicates that the method is suitable for these gases also.

4. Mercaptans, carbon disulfide, and thiophene do not interfere. Mercaptans do give a pink color in this method, but this effect is eliminated by the use of a light source of the proper wave length.

5. The preferred absorbent for hydrogen sulfide in this method is 2% zinc acetate solution.

CATHODIC PROTECTION — A Symposium. This book is available from the National Assn. of Corrosion Engineers, 919 Milam Bldg., Houston 2, Texas. It consists of 23 pages which were presented at the joint symposium on cathodic protection sponsored by the Electrochemical Society and the NACE at Pittsburgh, Dec. 8-10, 1947. The papers constitute a review of the state of development of the basic principles of cathodic protection and their application to the control of corrosion. They have been assembled in book form for ready reference. Price to members of the sponsor organizations is $6, to non-members, $8.

PREPARATION AND REVISION of Building Codes, Building Materials and Structures Report BMS116—by George N. Thompson. Published by the Bureau of Standards, the 17-page book is available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 15 cents a copy. Foreign orders must include an additional sum of one-third the publication price to cover mailing.

This booklet discusses principles and problems associated with building code requirements, gives sources of technical information and its applications, and reveals methods by which full advantage may be taken of new developments in materials and construction techniques.

PIPES, DUCTS, AND FITTINGS for Warm-Air Heating and Air Conditioning—Simplified Practice Recommendation R207-49, published by the Department of Commerce. The 24-page booklet is available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 10 cents.

Contents of the publication are outlined here:

Recommendation. It is recommended that prefabricated warm-air heating and air-conditioning pipes, ducts, and fittings be carried in stock only in the kinds and sizes listed herein.

Definition. For the purposes of this recommendation, warm-air heating and air-conditioning pipes, ducts, and fittings shall include the following:

1. Furnace pipe and fittings—gravity type.
2. Ducts and fittings for forced-air heating and air conditioning.
3. Take-off fittings for extended plenum systems.

By NEAL V. FOWLER JR.

Remote Controls Insure Safety In Big Inch Stations

TEXAS Eastern Transmission Corp., Shreveport, owner and operator of the Big and Little Inch pipelines, has recently completed the installation of a scheme of remote controlled automatic valves and blow-downs at its 21 active compressor stations designed to provide the maximum amount of safety to the company's personnel and property, and to minimize the extent of damage in the event of any emergency. Texas Eastern operates in 11 states from Texas and Louisiana to New York City and its 20-in., 24-in., and 26-in. main lines are now capable of delivering in excess of 700 MMcf daily.

Exclusive

The general plan of the remote control valve installation may be seen in *Fig. 1*. Four valves, marked B, C, D, and E in *Fig. 1*, are involved in the remote control installations. Valve B, a plug-type valve, is the station suction valve, controlling the flow of gas from the main line through the scrubber units, and into the compressor units in the station. Valve C, the station by-pass valve, is a gate-type, while Valve D, the station discharge valve, may be either a gate or a plug valve. Valve E is a 6-in. blow-down valve which is operated automatically upon full closure of Valve D.

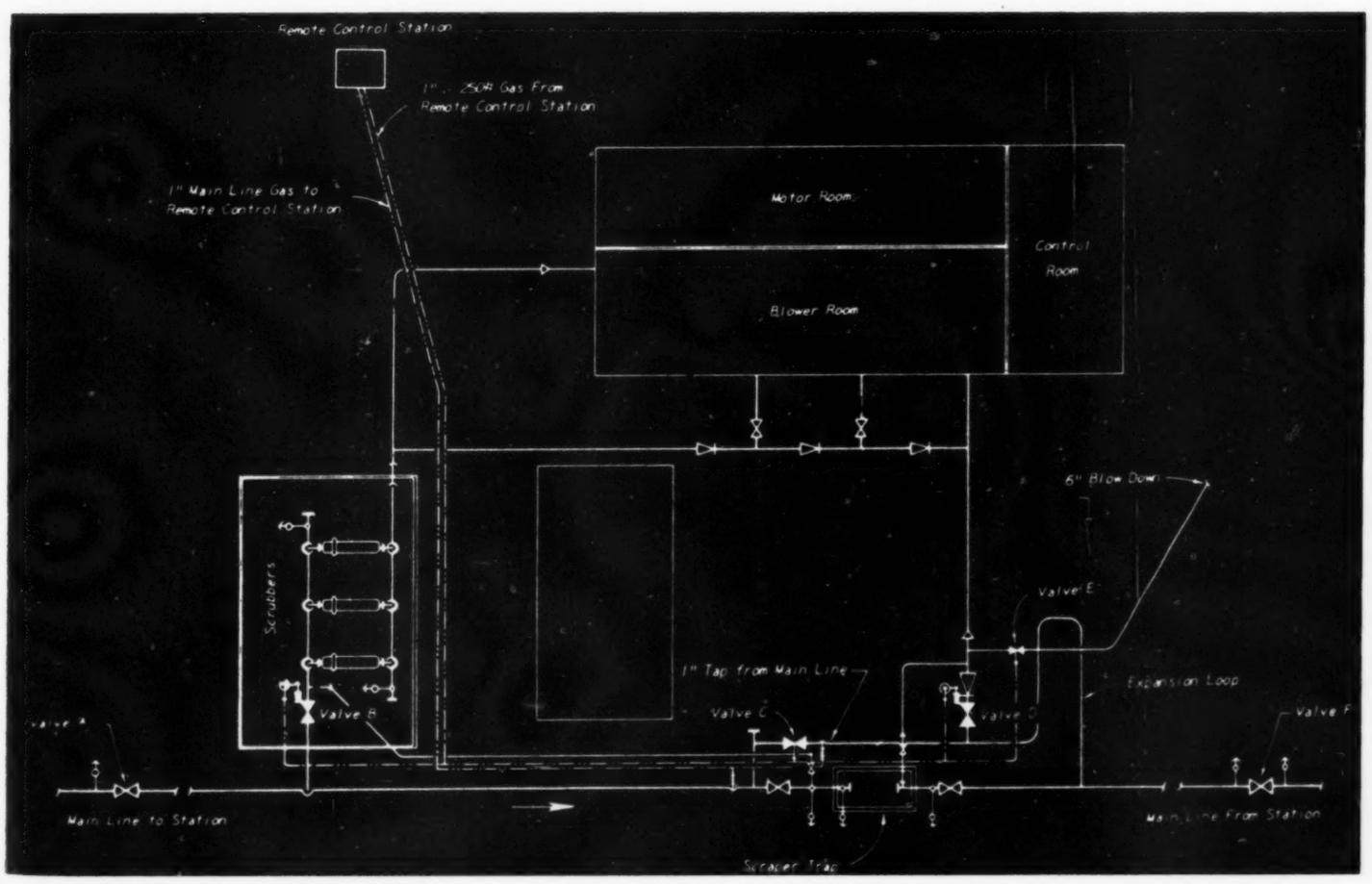
All of these valves are operated through one remote control valve located in a convenient, removed spot. When the control valve is thrown, Valve B closes, Valve C opens, Valve D closes, and Valve E opens by the operation of a trigger mechanism upon the full closure of Valve D. By such operation, the station is shut off the line in a matter of minutes and the flow of gas continues through the main lines without passing through the compressor station itself.

Valve A, the main line suction header, is a gate valve, and is fitted with a motor-operated closing mechanism controlled by a 1-in. valve located on the header itself. Valve F, the main line discharge header, is also a gate valve and is similarly operated and controlled.

Prime moving force for the operation of the valves is supplied by the natural gas itself, which, in the remote-controlled installation, is bled from the main line through 1-in. taps and is reduced by a regulator to 250 psi. One-inch steel lines lead from this regulator to the various valves, the flow of gas through these lines being controlled by a single 1-in. plug-type valve, as indicated in *Fig. 2*. On the header valves, the tap is made directly from the main line to the operating mechanism mounted on the valve itself.

Mr. Fowler is in the engineering department of Texas Eastern Transmission Corp.

Fig. 1. Typical centrifugal compressor station remote control valve piping layout, Texas Eastern Transmission Corp.



Valve Mechanism

The operating mechanism on the gate-type valves is actually an air-motor, built onto the valve, and equipped with a torque limiting device (trade-named "Limitorque") to prevent excessive strain on the gear train or the possibility of jamming the gate (See *Fig. 3)*. The plug-type valves operate on a hydraulic principle. A small oil storage tank is located adjacent to the valve (See *Fig. 4*).

When the remote control valve is

thrown, gas under pressure enters this tank from an inlet pipe at the top, forcing oil through a pipe at the bottom of a tank and into a hydraulic cylinder mounted on the valve closing unit. The piston of the cylinder is meshed with a small pinion keyed to the valve stem, and the travel limits of this piston accomplish the opening or closing cycle of the valve. Only a quarter-turn is required to effect complete closure on the plug-type valves.

Electrical Control

Suction and discharge valves on each compressor unit in the centrifugal stations are electrically controlled from a master control panel located at one end of the compressor building (See *Fig. 1*). By pressing buttons, the operator may shut one or more units off or bring them back on the line. To supply standby power in the event a power failure occurs, natural gas-operated generators are being installed at the stations, so that the unit valves may be electrically operated even in that contingency.

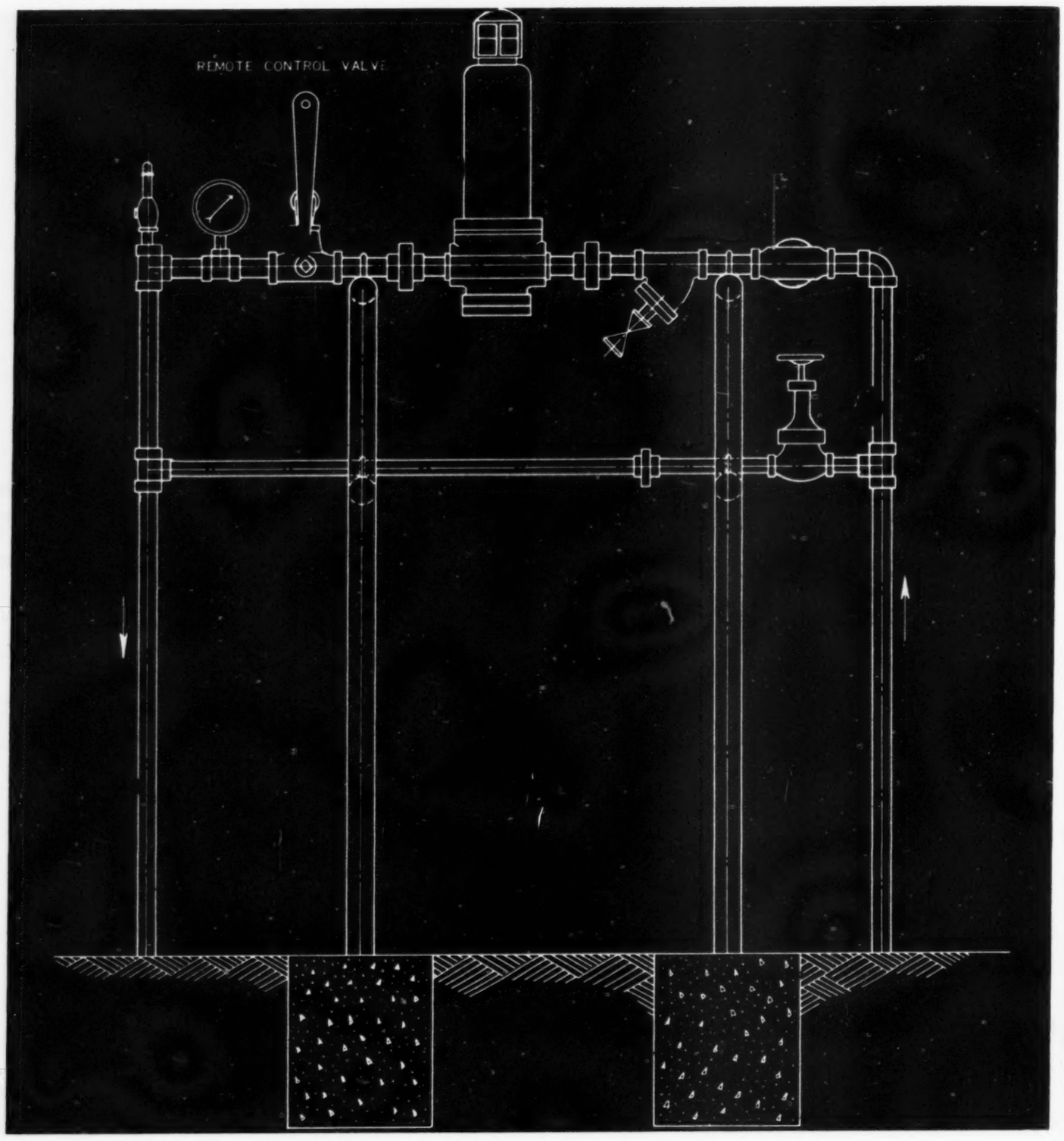


Fig. 2. Texas Eastern's remote control station setup.

Fig. 3. Typical control piping for Limitorque control gate valves.

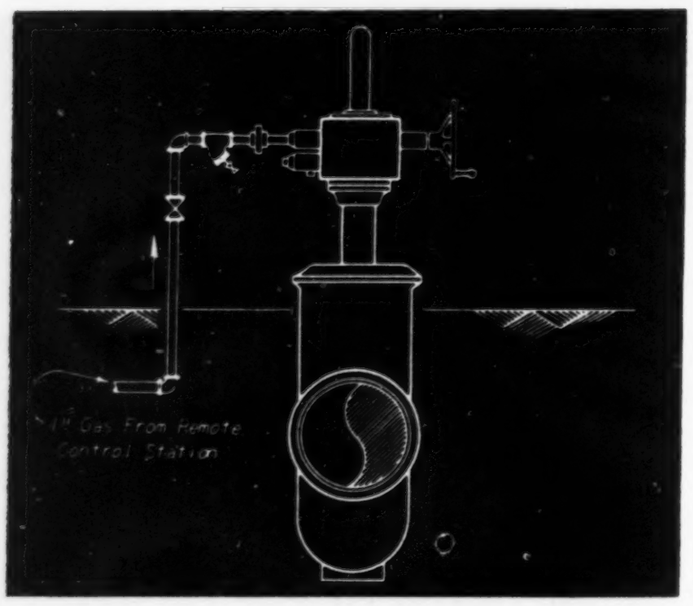
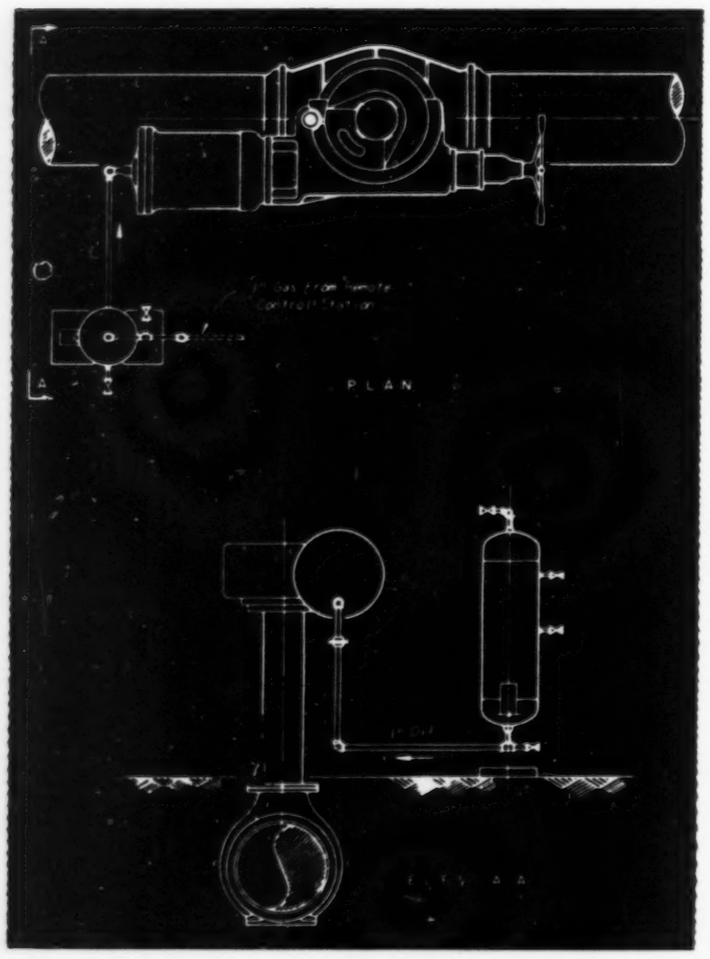


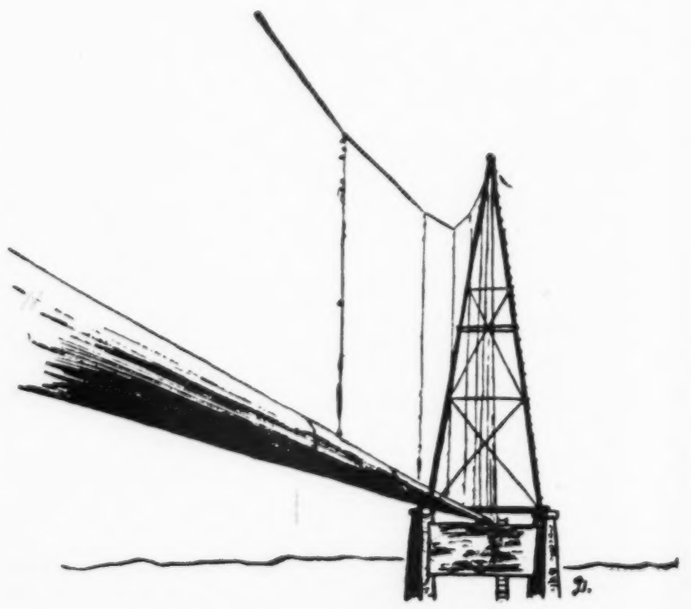
Fig. 4. Typical control piping for cylinder-operated plug valves, suction and discharge. Note small oil storage tank adjacent.



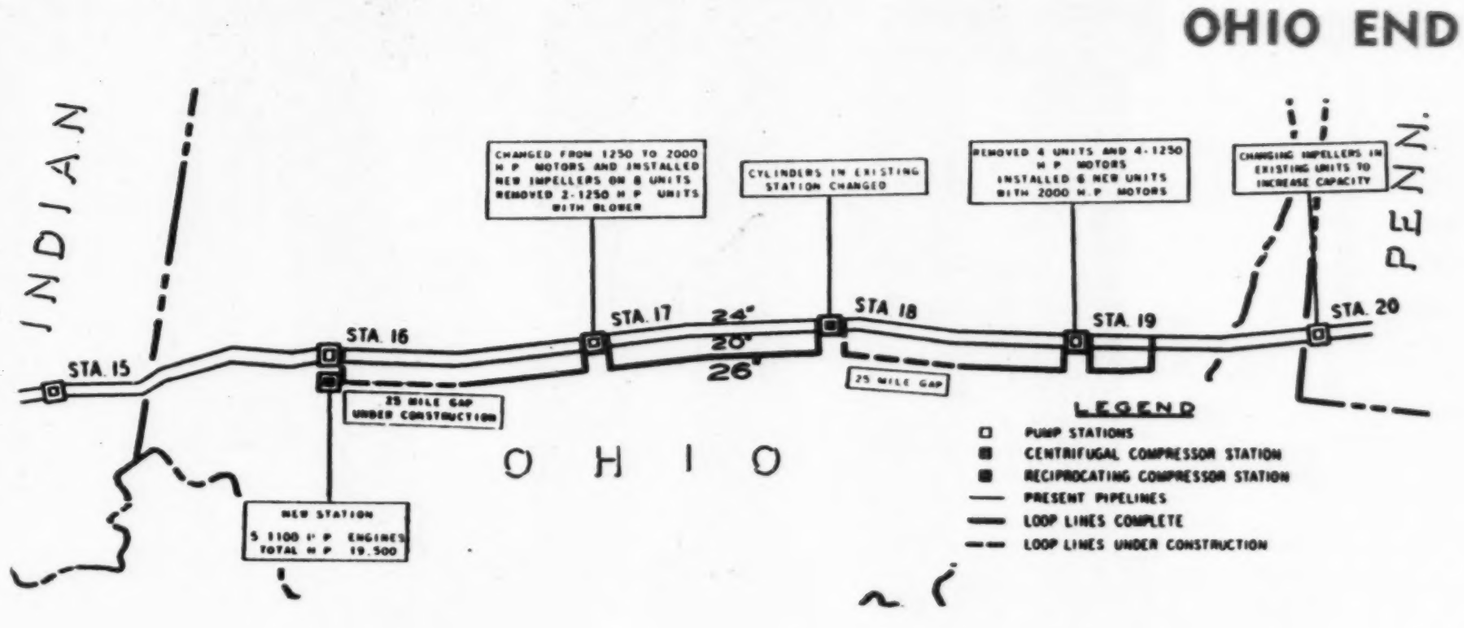
Blow-down vent lines and valves have been installed to permit the rapid exhaustion of any gas remaining in the station upon the closure of the station suction and discharge valves, and additional blow-downs have been provided at the sites of the header valves to permit blowing down the entire segment of line between the headers should that segment be isolated. The station blow-down operates from gas pressure on an air-motor principle, and, as has been mentioned, it is energized by a trigger mechanism which is tripped on full closure of the station discharge valve.

In the installation of the new valve control system, Texas Eastern likewise replaced all station yard valves of cast iron (semi-steel) construction of 16-in. and larger size with new all-steel valves, to provide increased margins of safety in its operations. In the change of these old valves for new valves, the company also relocated the header valves so that they would be sufficiently distant from the stations to be operated with ease in the event of emergency.

All of Texas Eastern's valves, of course, can still be operated manually as well as mechanically. Manual operation of a 26-in. gate valve, however, would take anywhere from 20 to 30 minutes time, whereas the mechanical closure can effect the 325-revolution operation in about three minutes.



BIG INCH



Major construction job to boost system capacity to 740 MMcf nears completion

By E. T. ROBINSON

TEXAS Eastern Transmission Corp.'s 24-in. "Big Inch" transcontinental line now has a 26-in. big brother alongside it throughout most of Ohio as a result of the company's construction work last summer. Approximately 55 miles of large diameter pipe was required to finish the loop when the work was terminated this past fall because of pipe shortage consisting of a 25-mile gap between Station 16 and 17 and another 25-mile gap between Station 18 and 19. Pipe became available in December to complete the gap between Station 16 and 17 and construction was started. Sixteen miles have been completed and completion of the entire gap is expected early in February, but right now the Inches and the new 26-in. loop will be able to take care of all the gas Texas Eastern will receive from Texas Gas Transmission Corp. near Lebanon, Ohio, in a cooperative expansion program which the two companies are undertaking.

Exclusive

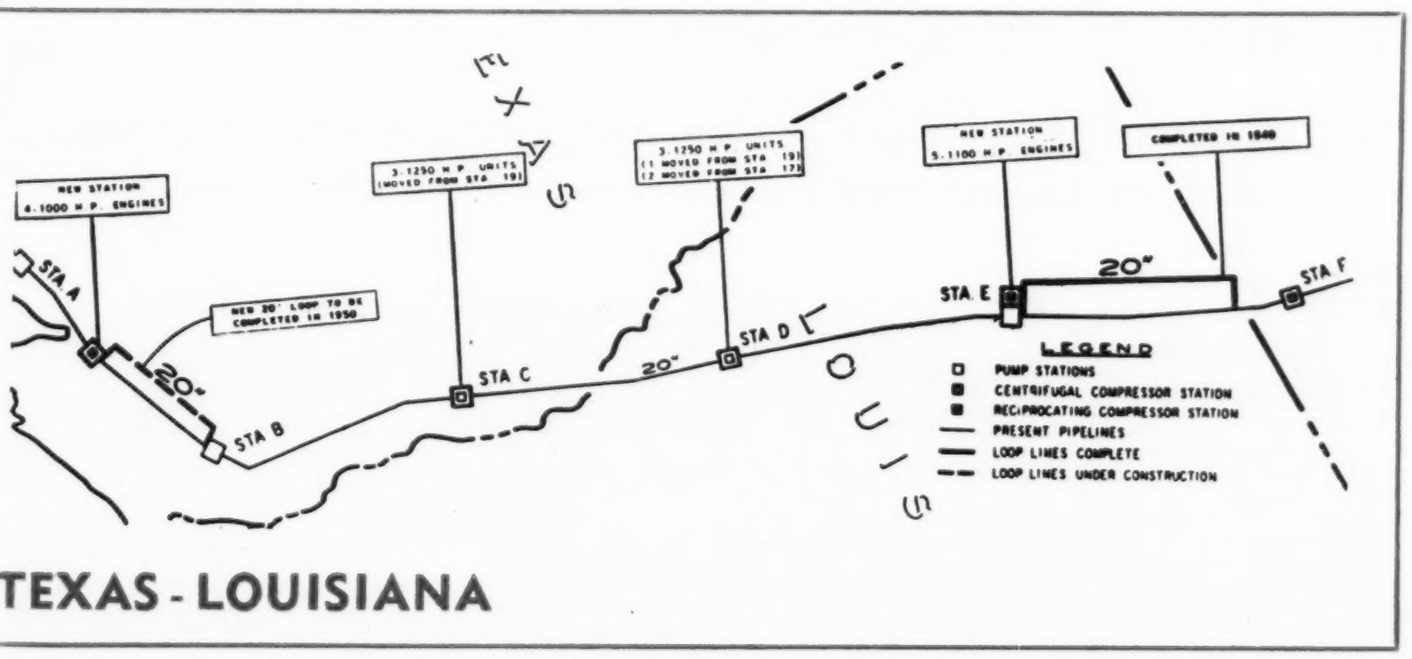
Mr. Robinson is an engineer for Texas Eastern, located at Shreveport.

The arrangement between the companies called for the sale and delivery to Texas Gas by Texas Eastern at a point near Lisbon, La., of up to 200 MMcf of gas per day, and sale and delivery by Texas Gas to Texas Eastern of up to 235 MMcf at a point near Lebanon. In order to make the deliveries to Texas Gas in Louisiana, Texas Eastern had to expand the south end of its system with 100 miles of 16-in. pipeline extending from Baytown, Texas, to a point near Provident City, in Lavaca county, Texas; some 33 miles of 20-in. loop line to the company's existing 16-in. line from Baytown to Beaumont, Texas, with a new reciprocating compressor station at the southern end of this loop, near Hankamer, Texas; activation of old WEP oil pumping stations near Newton, Texas, and Many, La., as new centrifugal-type compressor stations; and approximately 36 miles of 20-in. loop line paralleling the Little Big Inch from a new reciprocating compressor station to be built near Castor, La., north to a new Texas Gas compressor station to be built near Lisbon, La. In the north, the program called for some 177 miles of 26-in. loop line paralleling the Big and Little Inches from the company's Station 16, near Lebanon, Ohio, to a point just a few miles west of the West Virginia border, with a new reciprocating station near Lebanon, and revisions in horsepower or cylinder sizes at the company's present Compressor Stations 17, 18, 19, and 20, located near Circleville, Crooksville, Sarahsville, Ohio, and Windridge, Pa., respectively.

Maps above and below give an at-a-glance picture of the scope of the construction jobs undertaken by Texas Eastern to beef up its system. Boxes detail nature of modifications on sections of line and in booster stations.

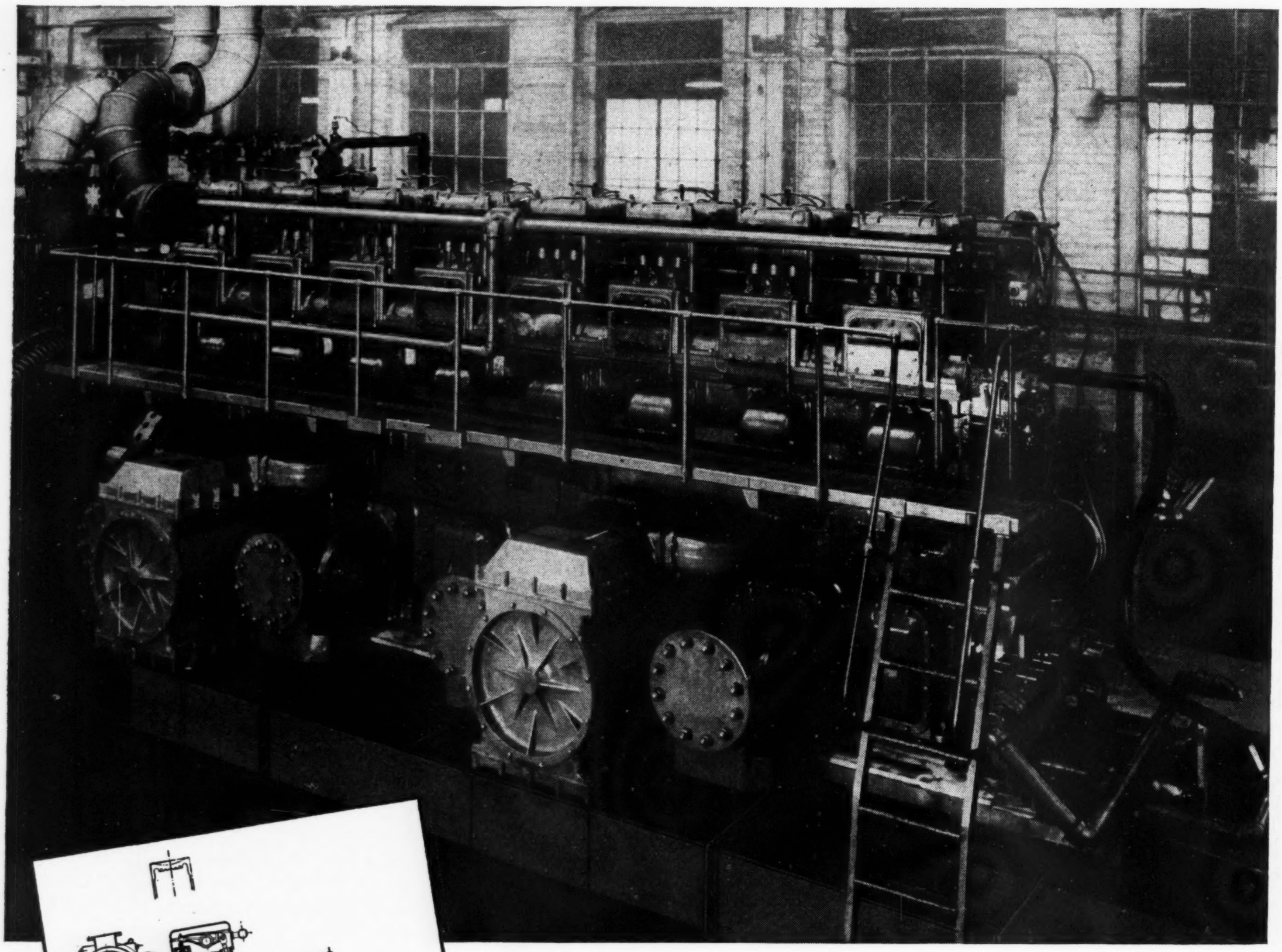
All construction under Texas Eastern's program was to be done by contract, with the exception of the work at Stations 17 and 18, a portion of the work at Station 19, and the work at Station 20, which was to be performed by company forces. First priority in the program was given to the work to be done in Ohio and Pennsylvania, which was started in March, 1949, with the awarding of pipeline contracts to Williams Brothers, Tulsa, and to Associated Pipe Line Contractors Inc., Houston. Brown & Root Inc., Houston, was awarded the contract to construct the compressor stations in this area except for that part to be done by the company. Of the 177 miles of 26-in. line to be constructed, Williams Brothers was given the easternmost 55 miles, which included the Muskingum river crossing. The remaining 122 miles, contracted to Associated, included four river crossings —Deer creek, Darby creek, Miami, and the Little Miami.

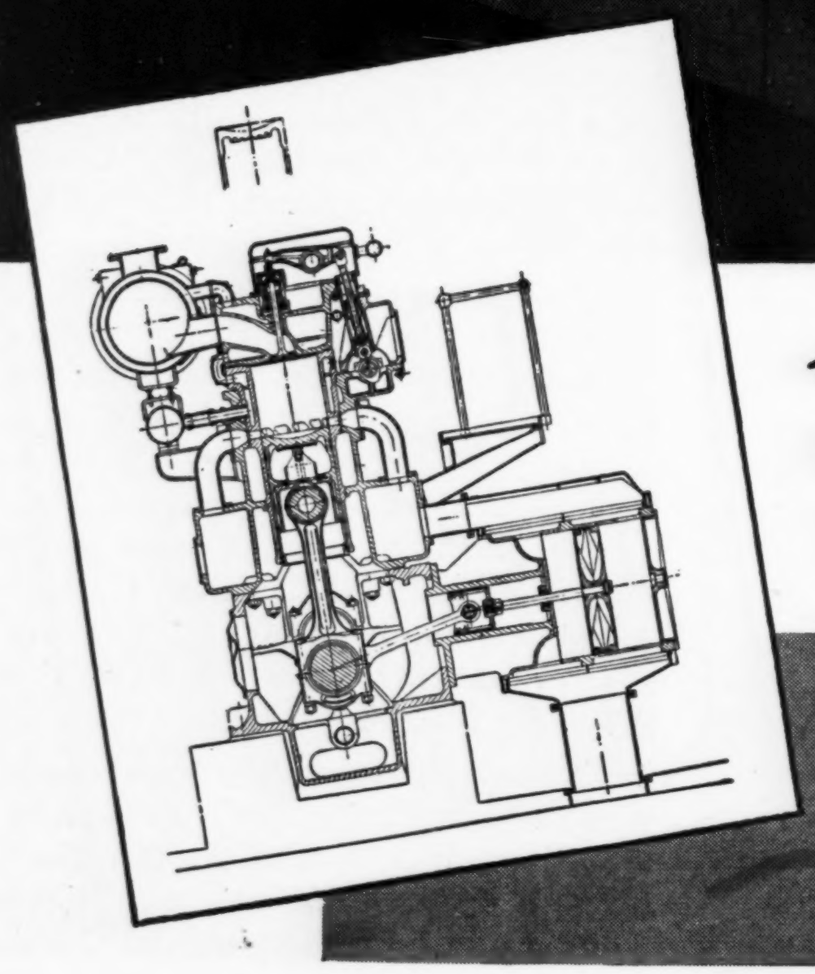
The acquiring of the rights-of-way was completed and the new line was staked parallel to and 25 ft from the nearest existing line. All welding and coating was done along the ditch. Inside



TEXAS - LOUISIANA

BRAND





▲ A uniflo UTC-16 on the test block.

◀ Section through engine and scavenging pump, showing 360° intake ports and the mechanical exhaust valves.

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Worthington Achieves a Triumph in Modern Angle Gas Engine Compressor Design with the Uniflo TYPE UTC-16's...Thru-Scavenging, 2-Cycle Engines of 800—2,000 HP that Hit New Highs in Efficiency AND Economy...Outstanding on Pipeline Duty

1. UNIFLO SCAVENGING — A RADICAL IMPROVEMENT OVER CONVENTIONAL LOOP SCAVENGING.

AIR PORTS AROUND ENTIRE CIRCUMFERENCE OF CYLINDER. Port area more than double.

EXHAUST THRU CAM OPERATED TIMED VALVES IN CYLINDER HEAD. Area 50% greater.

STRAIGHT LINE AIR FLOW thoroughly cleanses and cools entire cylinder.

SUPERCHARGING. Timed valves retain greater weight of pure air for perfect combustion.

THESE IMPROVEMENTS result in higher mean effective pressures without increased temperatures.

2. EN BLOC FRAME — permits use of removable cylinder liners.

3. DOUBLE AIR MANIFOLDS — doubles volume of air and steadiness of flow.

4. RENEWABLE CYLINDER LINERS — mean longer life and low-cost maintenance.

5. PISTON — completely symmetrical outer piston wall — wrist-pin supported in separate carrier.

6. CYLINDER HEAD — Worthington cone-type ... two large exhaust valves — streamlined passages.

7. GEAR DRIVEN CAMSHAFT — assures positive drive and perfect timing.

8. IMPROVED COOLING — jacket water space cast integral with liners, eliminating internal water seals.

9. LUBRICATING SYSTEM — Worthington cast-in manifolds, positive pressure lubrication to every running part.

10. ACCESSIBILITY — inherent in straight-line engine design, increased by large access doors on both sides of the engine frame.

11. WORTHINGTON FEATHER* VALVES: lightest, tightest, quietest ever made used in both compressor and scavenging cylinders.

"CUSTOM-BUILT" FOR ITS JOB

In addition to Worthington's experience covering half a century of building compressors for pipeline duty, more than seven years of intensive research devoted to developing the uniflo scavenging principles have gone into producing the TYPE UTC-16. The result is an Angle Gas Engine Compressor that meets the rigid requirements of gas pipeline service with more efficient use of fuel, cooler operation, improved accessibility and longer service life. For further facts about the uniflo TYPE UTC-16 — and proof that here, again, *there's more worth in WORTHINGTON* — contact your nearest Worthington Branch Office or the *Worthington Pump and Machinery Corporation, Engine Division, Buffalo, N. Y.*

*Reg. U. S. Pat. Off.

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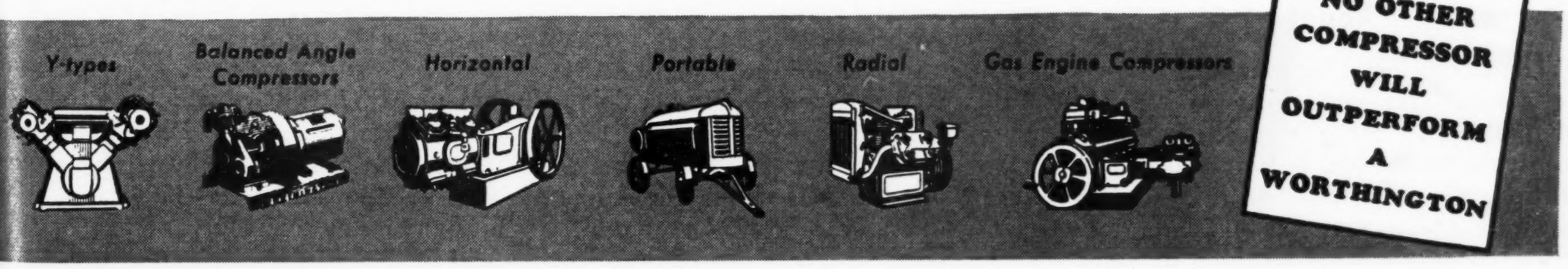


lineup clamps were used for stove-piping the joints, and the welds were made by using a 5/32-in. fleetweld No. 5 rod for the stringer, the second pass or "hot pass" being made with a 5/32-in. fleetweld No. 85 rod. The filler pass was made with a 3/16-in. fleetweld No. 85 rod, and the weld was capped with a 3/16-in. fleetweld No. 5 rod. This proved to be an excellent combination of rods to use on this high yield 52,000-lb tensile pipe, and all tests produced good results.

Weld Tests

The welders were given a standard proficiency test before they were qualified and, in addition, radiographs were made and approved before the welder was allowed to go to the firing line. The X-Ray Engineering Co. of San Francisco did the radiograph work. The company was assured of the best possible welding job by using a welder inspector to make a visual inspection on each weld and then supplementing such inspection by as many X-rays in a day as possible. At least one weld made by each welder was X-rayed daily, and all tie-in welds were checked by this method. Any welds found to have small defects when the X-ray was made were repaired by scraping out the defective area and rewelding and making another picture to insure a good job. This practice saved the contractor considerable expense by avoiding the usual practice of cutting out welds thought to be defective and testing them. Replacing the weld with a pup joint was a job which required several hours of extra work by the contractor. All river section welds were X-rayed.

Coal tar enamel was applied in a 3/32-in. layer by travelling type equipment over the ditch. This was followed by a single wrap of Fiberglas and a wrapping of Kraft paper. River crossings were double-coated by applying a flood coat of enamel followed by a single wrap of Fiberglas, then another coat of enamel and a single wrap of pipeline felt. A preformed padding furnished by Perrault Brothers was placed over the coating to protect it before dragging the river crossing in, and this same padding also proved successful for ditch padding across some of the rocky sections. Concrete weights were used to sink the pipe in river crossings.

Bends

The Coody bending machine, proved very successful in making cold bends in the field. Some sections of line, particularly on the Williams Brothers section, averaged from 70 to 100 bends per mile, and as many as 30 bends were made in single 40-ft sections of pipe.

COMPRESSOR PROGRAM

North End

The new equipment at Station No. 16 near Lebanon, Ohio, was placed on the line Oct. 1. This station, prior to the new construction, had two centrifugal compressor stations, one each on the 20-in. and 24-in. line with a total of 14,000 hp. The new reciprocating compressor station has five 1100-hp units, bringing the total horsepower available at this station to 19,500, with a through-put capacity of 743.1 MMcf.

Station No. 17, Circleville, Ohio, has been completed and the original horsepower of 12,500 has been increased to 16,000 by replacing 10 1250-hp motors with eight 2000-hp motors, to bring the capacity up to 742.1 MMcf.

Station No. 18, Crooksville, Ohio, has been completed and, by changing the cylinders in the existing reciprocating compressor, the capacity of this station has been increased to 688.3 MMcf.

Station No. 19, Sarahsville, Ohio, is now in operation. Its previous horsepower has been doubled from 6000 to 12,000 by addition of two units and changing motors. The station capacity is now 687.3 MMcf.

Station No. 20, Windridge, Pa., has had its capacity increased to 411.3 MMcf of gas per day by changing the impellers in the existing blowers.

South End

The work on the compressor stations in the south end of the system is being done by Brown & Root and construction has been underway for some time.

Station E, Castor, is complete and consists of five 1000-hp reciprocating compressors with a capacity of 175 MMcf of gas per day.

Station D, Many, is complete and consists of four 1250-hp centrifugal compressors, having a capacity of 177.5 MMcf of gas per day.

Station C, Newton, Texas, was completed on schedule and consists of three 1250-hp centrifugal units with a capacity of 177.5 MMcf.

Station B, near Hankamer, is now ready for gas service and the final touches are being added. This station has four 1000-hp reciprocating compressor units with a capacity of 158.2 MMcf.

Actual construction on the Ohio job was started March 11, 1949. During the first two weeks very little progress was made on this rugged, rocky spread because of extremely bad weather, but as the weather cleared the spread increased its pace to a high of 3500 ft of pipe laid per day, and averaged 2000 ft per day for the entire job.

Pipe to complete the 55 miles of the Williams Brothers section was delayed and the contract was therefore terminated at the end of 49 miles. This was a few miles short of the Muskingum river, but river pipe was available for the crossing so it was installed and will be tied in when pipe becomes available to complete the line. All pipe laid was tied into existing lines with cross-overs and placed in operation for winter service.

West From 18

On March 19, 1949 Associated began construction of its 122-mile contract, beginning at Station 18 and working west. With good rolling terrain, it did not take this spread long to get under way, and the men laid as much as 6000 ft per day with a 3500-ft per day average for the job.

This contract also was terminated after 73 miles had been laid which fell short of one river crossing. Pipe for the crossing was on hand and it too was installed and left for a later tie-in. There remained to be laid in this section approximately 25 miles in the west end and a 25-mile gap from Station No. 18 east to a point some 2 miles east of the Muskingum river when the contract was terminated. Since the contract was terminated, pipe has become available to comlpete the 25-mile section in the west end, and construction was again started in December with Associated doing the work. Sixteen miles have been completed to date and construction of the gap is expected to be completed in February. As in the case of Williams Brothers' job, the completed portion was tied into existing lines. Brown & Root and Texas Eastern have completed all of the necessary compressor stations in this area on schedule.

On Schedule

The work on the south end of the system proposed under this program will be completed on schedule with the exception of the 16-in. extension of the Little Big Inch from Baytown, Texas, to Provident City, Texas, and the 20-in. Texas loop from Station B to Beaumont, Texas.

Completion of the 20-in. loop in Louisiana was reached in December and this line was placed in service. Associated was awarded the contract for laying the loop from Station E to Lisbon, La., and this construction was completed on schedule with the help of some very good weather. Similar construction methods as were used on the 26-in. Ohio loop are being used on the 20-in. loop.

Upon completion of the present construction program, Texas Eastern will have a total installed horsepower on its system of 272,650, of which 88,400 will be reciprocating and 184,250 centrifugal. The total mileage of pipe added will be approximately 350 miles. The designed sales capacity of the system will be 740 MMcf of gas per day.

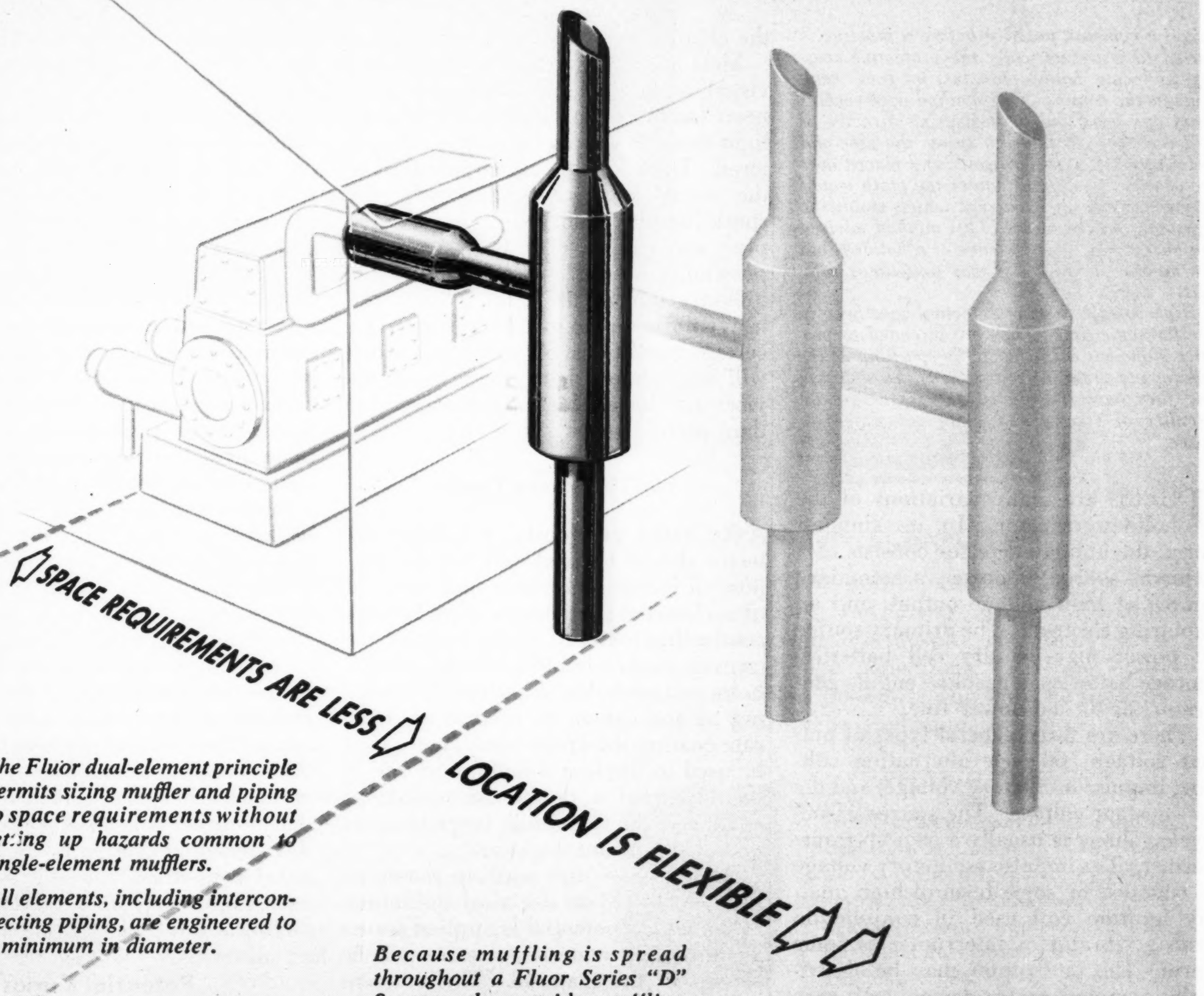
See for yourself...

the installation advantages of a FLUOR SERIES "D" MUFFLER SYSTEM

NO LONGER is ultimate muffling efficiency dependent upon trial-and-error locating of exhaust piping. With the Fluor Series "D," exhaust piping can be of *smaller* diameter, location of outside exhaust chamber *flexible* without affecting pressure drop or noise attenuation and pulsation reduction efficiency.

The reason lies in the unique dual-element design of this muffler *system.* Work is started on pulsative exhaust gases *at* the engine—noise and pulsation reflections are virtually eliminated *at* their source. The Fluor Series "D" Muffler is a *system* that incorporates *two* muffling elements—a primary element located in the immediate proximity of the engine and a secondary element located *at any desired spot* outside the engine room.

The Fluor Series "D" Muffler System is the answer to your muffling problems. In addition to installation flexibility it provides the highest muffling efficiency obtainable—*at a cost competitive with conventional mufflers.*



The Fluor dual-element principle permits sizing muffler and piping to space requirements without setting up hazards common to single-element mufflers.

All elements, including interconnecting piping, are engineered to a minimum in diameter.

Because muffling is spread throughout a Fluor Series "D" System, the outside muffling chamber can be set at any desired distance from the engine room wall.

AVAILABLE FROM STOCK—A Fluor Series "D" Muffler System to fit virtually any 2- or 4-cycle, 200 to 2400 HP diesel engine is available from stock. You need only submit engine room design and dimensions, make, model and RPM of engine and whether muffling system is to be air-cooled or non-air-cooled. Inquiries will be answered promptly.

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Use and Abuse Of Holiday Detectors

By T. H. GILBERT

It is a common practice before a pipeline is buried to test electrically the protective coating to locate holes, pinholes, or very weak spots in the coating. One method used several years ago consisted of measuring directly or indirectly the resistance between the pipe and a cloth soaked with salt water and placed over the coating. A holiday under the cloth would permit passage of a current which would be registered on the meter. This method advised the observer of the existence of a holiday, but the matter of finding it was sometimes difficult.

High voltage holiday detectors have been in use for some time. They are intended to produce sufficient disturbance by sparking at the holidays to draw the attention of the operator, and they have the big advantages of greater rapidity of testing and more complete coverage.

THERE are many variations of the holiday detector. In its simplest form, the holiday detector consists of a primary source of power, a secondary source of high voltage output, and an exploring electrode. The primary source of power may be dry cell batteries, storage batteries, a gasoline engine generator, or an a-c power line.

There are three general types of output voltage: 60-cycle alternating voltage, impulse oscillatory voltage, and d-c or constant voltage. The source of 60-cycle voltage is usually a step-up transformer. The impulse oscillatory voltage is supplied by some form of high quality ignition coil used in conjunction with a vibrator or interrupter of some form. The interrupter may be electrically operated, motor driven, or it may be a part of the ignition coil as in a Model T Ford ignition coil. The source of the d-c constant voltage may be the same as that for the impulse oscillatory voltage except that a rectifier is added to the secondary of the coil.

The exploring electrode usually consists of a wire or gauze brush, flat or curved to fit the circumference of the coated pipe, or a close wound coil spring placed completely around the coated pipe. The coil spring electrode rolls along the surface of the coating as the coating is tested.

Most holiday detectors also employ a visual or audible indicator such as a neon lamp, bell or buzzer to produce light or noise when a holiday is encountered. These signals are in addition to the sound and arc produced by the spark jumping from the electrode to the pipe, and are provided to overcome the possibility of overlooking some of the holidays due to the light of day and heavy noise on the job. However, under certain conditions of operation which will be explained later, these signal devices may have a higher nuisance value than usefulness.

No Thickness Tester

As stated previously, a holiday detector should be used only for the purpose of locating holidays such as spots of carbonized particles or other foreign conducting material in the body of the coating, broken bubbles, checks, cracks, holes and pinholes, skips, etc. It should not be and cannot be used as an accurate coating thickness tester, nor can it be used to disclose a holiday in one of the layers of a double or multilayer coating if the remaining layer is intact and of significant thickness.

All effective pipe coating materials may be classed as electrical insulators. When a high potential is applied across an insulating material, stresses will be set up in the material. The inherent nature of dielectric failure under voltage stress is an abrupt change from the state of being substantially nonconducting to that of conducting. The breakdown voltage or dielectric strength of an insulating material is a property which varies with many factors such as thickness of the specimen, size and shape of electrodes used in applying voltage, form or distribution of the field of electric stress in the material, frequency of the applied voltage, rate and duration of voltage application, fatigue with repeated voltage applications, temperature, and moisture content. In fact, even the magnitude of the applied useful test voltage is a factor which cannot be accurately controlled on a coated pipe.

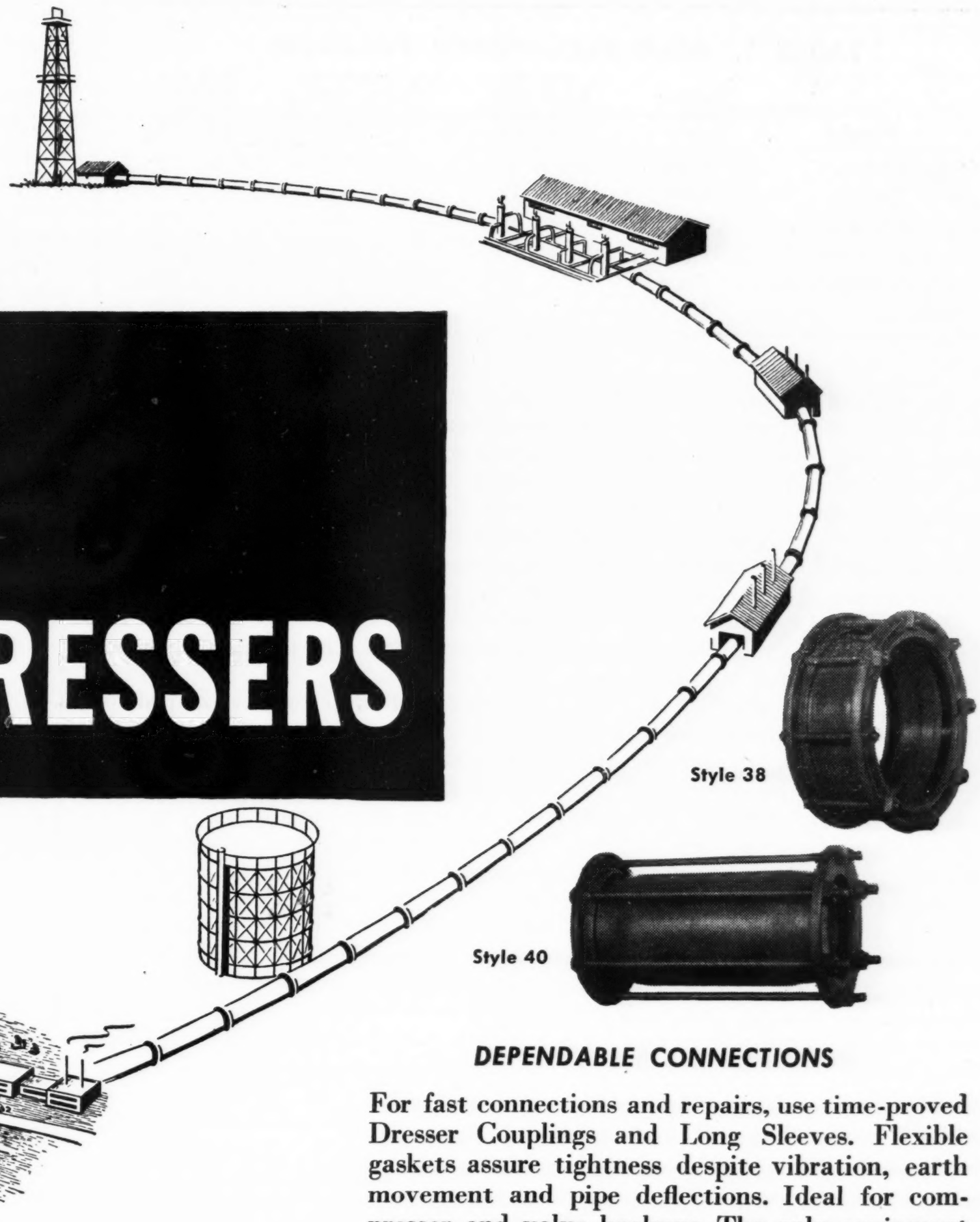
It becomes apparent that a holiday detector cannot be relied upon to measure coating thickness or locate thin spots of significant thickness with any degree of accuracy when it is realized that there are so many uncontrollable factors affecting the dielectric strength of pipe coating materials, some of the factors possibly affecting the dielectric strength more than the coating thickness which is the one it is desired to control or measure. However, a holiday detector probably can be relied upon to detect and rupture very thin spots in some coating materials having a thickness in the order of magnitude of 0.005 to 0.010 in. if the proper applied test voltage is available.

The question of "What is the proper test voltage?" has been widely discussed and, probably, in a great many cases without an accurate knowledge of the true test voltage at the electrode. Holiday detectors have been suspected many times of making holidays rather than revealing them. It may be well to emphasize here that generally a holiday detector does not cause or produce holidays in sound coating by means of electrical over-stress unless it is definitely used improperly on a coating material having a low dielectric strength.

Potential Varies

Between sharp points, a potential of about 28,000 volts is required to jump an air gap of 1 in. If the gap is formed between smooth objects of large radius, it may require as much as 70,000 volts to jump 1 in.[1] This means then that a voltage of somewhere between 7000 and 17,500 volts will be required to jump a straight air gap in a double coating ¼ in. thick, and between 2600 and 6600 volts will be required to jump the air gap in a single layer coating 3/32 in. thick. Mastic coatings approximately ⅝ in. thick require voltages of between 11,500 and 28,800 volts just to

Presented before the PCGA technical service group conference, Los Angeles, April 28-29. Mr. Gilbert is in the research department of Southern California Gas Co.



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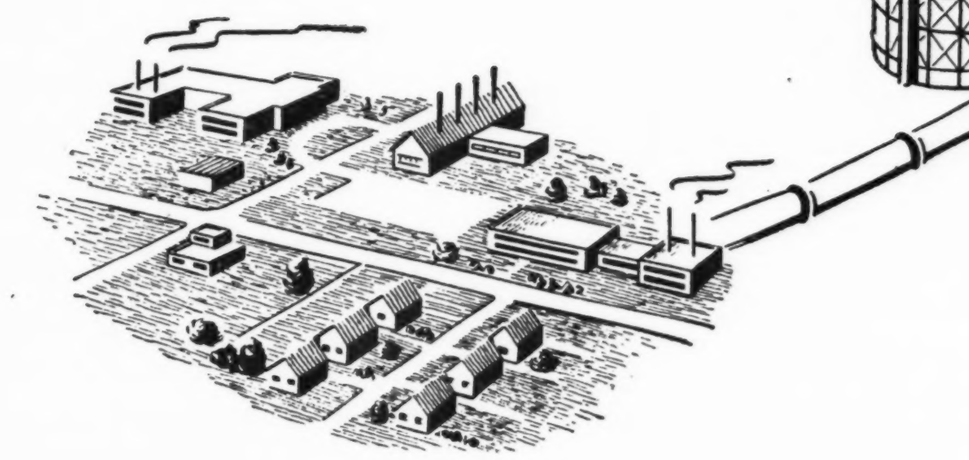

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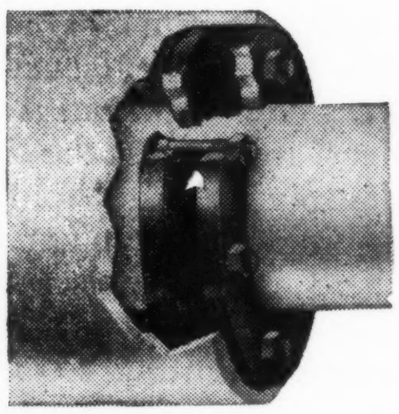

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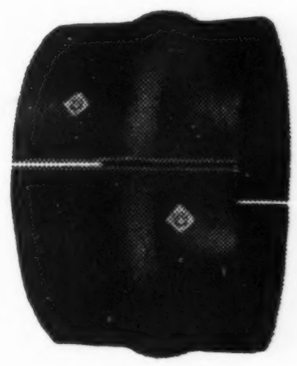

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TABLE 1. PEAK BREAKDOWN VOLTAGES

Material	Coating Thickness, Inches	Avg. 60 Cycle Volts To Rupture, Volts/Mil	Avg. Impulse Oscillatory Volts To Rupture, Volts/Mil	Avg. d-c Volts to Rupture, Volts/Mil
Unfilled Asphalt	0.049	Above 495	Above 525	Above 690
Filled Asphalt	0.045	510	540	710
Coal-tar Enamel 1	0.015	394	406	555
Coal-tar Enamel 2	0.010	750	795	1040
Coal-tar Enamel 3	0.004	478	492	669
Plastic	0.034	700	720	980

jump the straight air gap in a holiday. If the holiday is not straight through coatings, higher voltages are required.

The voltages mentioned so far are those required only to cause a spark to jump a straight air gap of specified length, and will be referred to as available test voltages. The terminal voltage or open circuit voltage of a holiday detector must be higher than the test voltage to compensate for voltage losses. These voltage losses are due to electrode-to-pipe capacity and to leakage resistance. The voltage loss due to capacity effects may be quite high for impulse oscillatory voltage detectors, but there should be no voltage loss due to this effect with direct current or 60-cycle alternating voltage detectors.

The voltage losses due to leakage resistance will vary and depend upon the coating material, the type of wrapper, moisture in the coating and wrapper, moisture in the atmosphere, moisture on the wiring, the presence or absence of whitewash on the coating, and the size of the coated pipe which usually determines the area of contact between the electrode and the coating.

Asbestos felt wrappers are actually effective, though relatively poor, electrical conductors because they have the ability to absorb moisture from the atmosphere like a blotter. Tests recently made on a hot, dry day with two different types of holiday detector on a 20-in. coated pipe having a 15-lb asbestos felt wrapper indicated voltage losses of 3000 and 3500 volts due to moisture leakage resistance in the wrapper. After a rain or on foggy or moist days enough leakage current will flow on such a wrapper to operate signal devices continuously even though there is no spark discharge from the electrode.

Under these conditions of high leakage current the voltage losses are so high that it is sometimes questionable whether there is enough available test voltage remaining at the electrode to locate a holiday, and the only safe procedure to follow is to disconnect the signal device, make a deliberate holiday in the coating, and then determine if the detector will spark as it passes over the holiday. If the detector does not spark at the holiday, testing should not be continued until the wrapper dries out. The moisture in the wrapper may not be sufficient to be visible to the eye, so it is necessary to check it from time to time with the detector.

Tests were conducted recently in the Southern California Gas Co. engineering laboratory to determine the breakdown voltage of several pipe coating materials—an unfilled asphalt, a filled asphalt, three coal-tar enamels, and a plastic as sprayed on a 4-in. pipe. These coating materials are and have been used by this company, but the test results obtained from them should not be considered representative of all similar materials.

In the breakdown tests the coated steel formed one of the electrodes and a 7/16-in. steel ball held lightly against the coatings formed the other electrode. The test voltage was applied by build-up from zero at a rate of approximately 1000 volts per second until rupture occurred. This value was recorded as the breakdown voltage, and the coating thickness was then measured at the point of rupture. The results are expressed in volts per mil in *Table 1*.

The lowest peak breakdown voltage found in this series of tests using three different types of voltage was approximately 400 volts per mil. The voltage required to break down coatings of these materials having several different thicknesses, and also the voltage required to jump air gaps of the same length are shown in *Table 2*. These figures are based on a dielectric strength of 400 volts per mil for the coating materials and 28 volts per mil for air between sharp points.

These figures, although at best they show only relative order of magnitude, are presented to compare the minimum voltages required to rupture several pipe coating materials with the minimum voltages required to rupture equivalent air gaps or holidays. From this comparison it appears that the answer to the question, "What is the proper test voltage?" can usually be that it depends almost entirely on coating thickness. Recommended test voltages for use on present day coatings are listed in *Table 3*.

TABLE 3. RECOMMENDED TEST VOLTAGES TO BE AVAILABLE AT THE ELECTRODE

Coating Thickness, Inches	Volts Min.	Volts Max.
1/64	1,000	3,000
1/32	2,000	6,000
1/16	3,000	12,000
3/32	4,500	18,000
1/8	6,000	24,000
5/32	7,500	30,000
1/4	12,000	48,000
5/8	30.000	.....

One other important consideration in the use of holiday detectors is the danger from electric shock to personnel operating the detector. The short-circuit current of the detector should be controlled or limited by current-limiting devices so that it will be less than the minimum let-go current. The let-go current is defined as the value of current that an individual can withstand without harmful effects for at least the time required for him to release his hold on the circuit. The minimum let-go current is reported to be 8 milliamperes.[2] If a neon transformer is ever used as a holiday detector, current-limiting resistors having sufficient resistance to keep the short-circuit current well below 8 milliamperes must be employed.

If the short-circuit current from a holiday detector is kept below the minimum let-go current, the shocks caused by accidental contact with the high potential side of the circuit are more of a nuisance than a hazard. Although deaths to persons with weak hearts have been reported from low-current shocks,[3] a more likely casualty might be caused by the involuntary recoil from a shock.

TABLE 2. MINIMUM PEAK VOLTAGE NECESSARY TO RUPTURE

Material	Thickness, Inches 1/64	1/32	1/16	3/32	1/8	5/32	1/4
Coatings from Table 1	6,000	12,400	24,800	37,600	46,000	62,400	100,000
Air	420	868	1,740	2,600	3,500	4,400	7,000

1. "Static Electricity," Francis B. Silsbee, National Bureau of Standards Circular C438, June 10, 1942.
2. "Effects of Electricity on the Human Body," W. B. Kouwenhoven, *Electrical Engineering*, March, 1949, page 199.
3. "Shock," *The New Yorker*, Dec. 11, 1948.

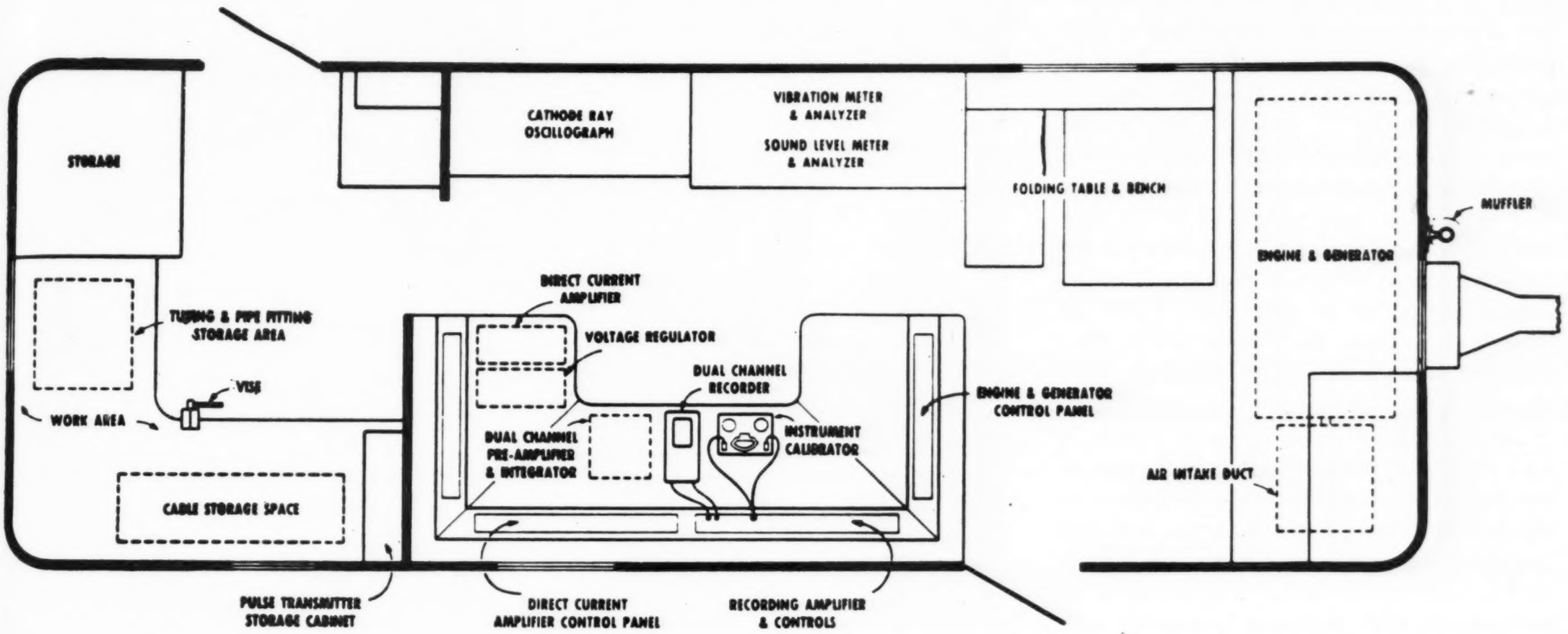

Fig. 2. Interior plan of the mobile laboratory.

Mobile Laboratory

for testing performance of pulsation dampeners in compressor stations

By RAY C. SOLLARS

DURING the early development of pulsation dampeners, it was obvious that suitable instrumentation would be necessary in order to determine performance characteristics. In both experimental and field installations, it was necessary to make pulse pressure measurements in several parts of the piping and other equipment associated with compressor installations in order to obtain an overall picture of pulsation dampener performance.

It is well recognized that pulsative gas streams are responsible for vibration in piping and vessels, resulting in fatigue of the metal and frequently ending in costly failures. In addition, it is also recognized that vibration of piping, cooling coils, vessels, etc. near compressors may be caused by mechanically transmitted forces originating with the compressor itself. In order that the effectiveness of pulsation dampening might be evaluated, it was necessary to provide instrumentation which would make it possible to separate and classify as to amount these two forces of vibration in order to determine whether gas pulsation or mechanical conduction was the major contributing cause of the vibration observed. It is known that pulsating gas flow can introduce considerable error in metering operations; this knowledge led to consideration of instrumentation that would record instantaneous pressure drop across orifices in order to evaluate metering errors.

It was immediately recognized that mechanical instruments would in general be quite inadequate for the purpose at hand due to their poor response to frequencies above a few cycles per second, since it is not uncommon to find frequencies as high as 70 cycles per second in pulsating gas streams. The field of electronic instrumentation was invoked, therefore, to provide the necessary requirements. The discussion below will describe the various instruments used together with their application and will describe further the mobile unit designed to facilitate their transportation.

Early Practice

In the initial phases of pulsation dampener installations, in order to make a survey of a compressor station, it was necessary to gather a few electronic instruments together in a car, drive to the jobsite, and set up the equipment on bridge tables or other

The author is assistant research engineer, The Fluor Corp. Ltd.

suitable supports. Under such conditions, it was impossible to shock-mount the delicate electronic instruments properly to protect them from damage while in transit or from disturbing vibrations set up by moving equipment such as compressors and auxiliary engines during prosecution of the survey.

It was also impractical to carry in a car more than the necessary equipment for a particular type of survey. It often happened while in the field, 1500 or more miles from the main plant, that another survey job of a different type would be necessary only a comparatively short distance away. As a result, it was necessary to return for a change of equipment, or to ship this equipment to the jobsite, increasing the time and cost required to make a survey. Furthermore, difficulties were experienced at the jobsite with the line frequency and voltage constantly changing due to the small capacity of most electrical generating plants to supply variations in load. These changes would cause the instruments to become unstable and draw-oscillograms were erratic or unstable.

Finally, the handling of cables to connect the instruments with the pulsation pickups at the various test stations became quite a problem as these test stations would sometimes be as much as 500 to 1000 ft apart. It was also found that some very desirable test points, such as in meter runs at some distance from the station and cross-country pipelines, had to be neglected because of the lack of a nearby 110-volt supply source.

Consolidation Is Best

From the problems encountered, it was decided that consolidation of the instruments would be desirable; a trailer some 20 ft long and 8 ft wide was selected for the purpose. The trailer was originally designed as a house trailer, excluding most of the interior cabinets and fixtures. All internal surfaces of the trailer are covered with birch plywood, while the outer surface or shell is completely covered with sheet aluminum. Between the inner and outer surfaces is a 1-in. thick layer of fireproof heat-insulating material. The frame of the trailer has been suitably strengthened to handle the load of the power supply which is mounted near the front.

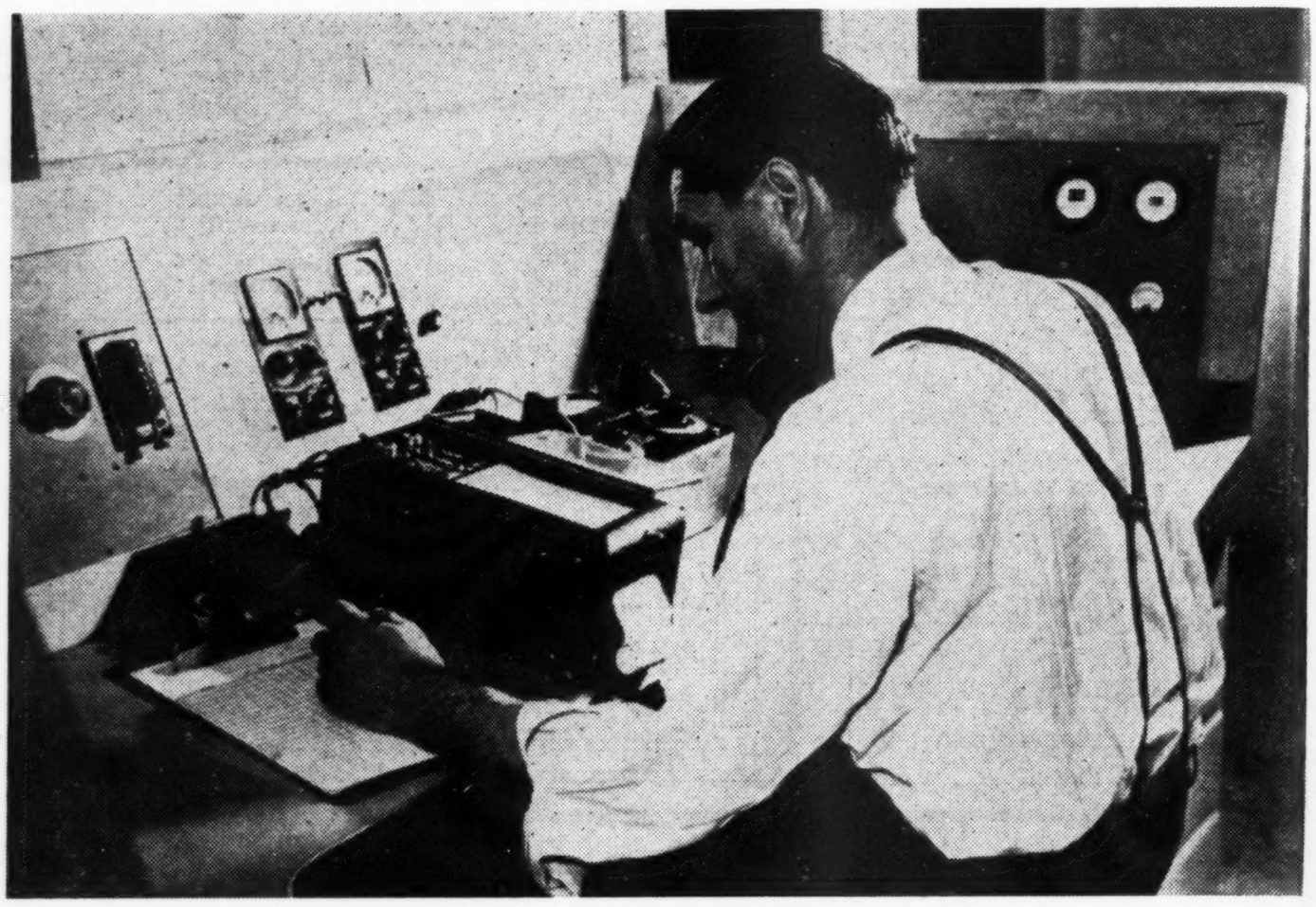

Fig. 3. Console panels hold lab's control instruments.

Trailer Gear

The trailer running gear consists of a single axle equipped with electric brakes and heavy duty flat base wheel rims on which are mounted transport delivery 8-ply tires, allowing the trailer to travel on flat, hard surfaced roads at 50 mph. To prevent the trailer tires being damaged in case of a slow leak or puncture, a "feeler arm" is mounted on each end of the axle extending to within 1 in. of the roadway. When the tire starts to flatten, the "feeler" arm brushes the roadway, deflecting and closing a circuit to the buzzer alarm in the truck cab. The soft-tire detector is necessary because a soft tire on the trailer causes no noticeable change up in the truck cab and the tire would soon blow by overheating due to underinflation. Finally, the trailer is equipped with independent, electrically operated brakes which are controlled from the tractor cat.

Originally, the mobile laboratory with a conventional trailer hitch was drawn behind an automobile, but this was soon discarded as inadequate for hauling the trailer over rough roads and up steep grades encountered in traveling from one jobsite to another. The trailer was then provided with a special hitch arrangement for coupling directly over the rear axle of a ¾-ton Chevrolet truck equipped with a four-speed transmission and a heavy-duty rear axle. *Fig. 1* shows the trailer coupled to the truck.

No Accommodations

The interior of the trailer has not been equipped with food preparation, sleeping, or bathing facilities because of the large amount of space that would be required for them, and the problem of heating the trailer in a compressor station or refinery area would be difficult because of the fire hazard.

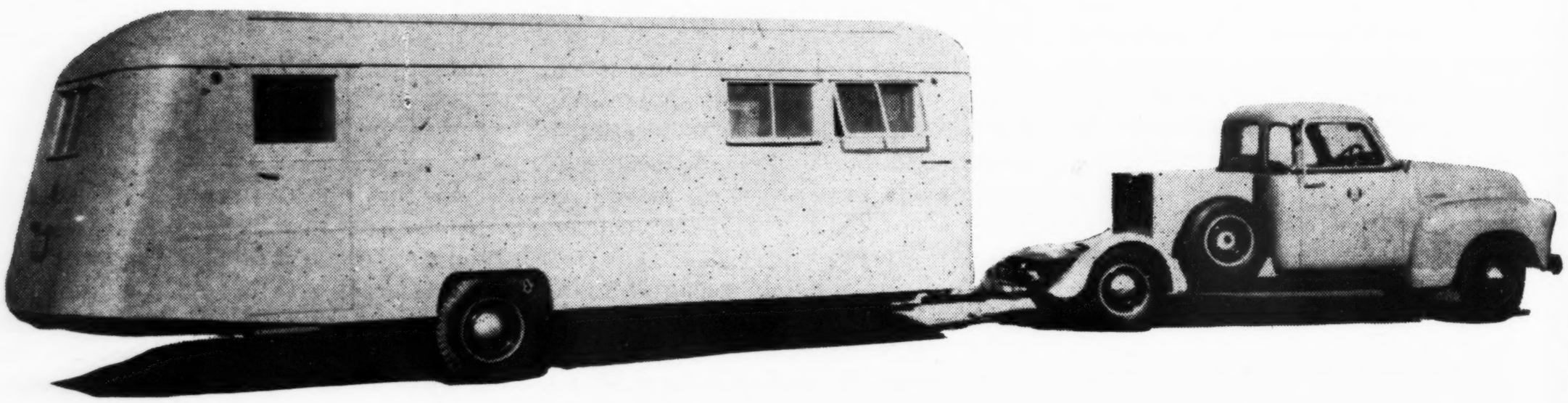

Fig. 1. View of the laboratory-trailer and the converted truck that hauls it.

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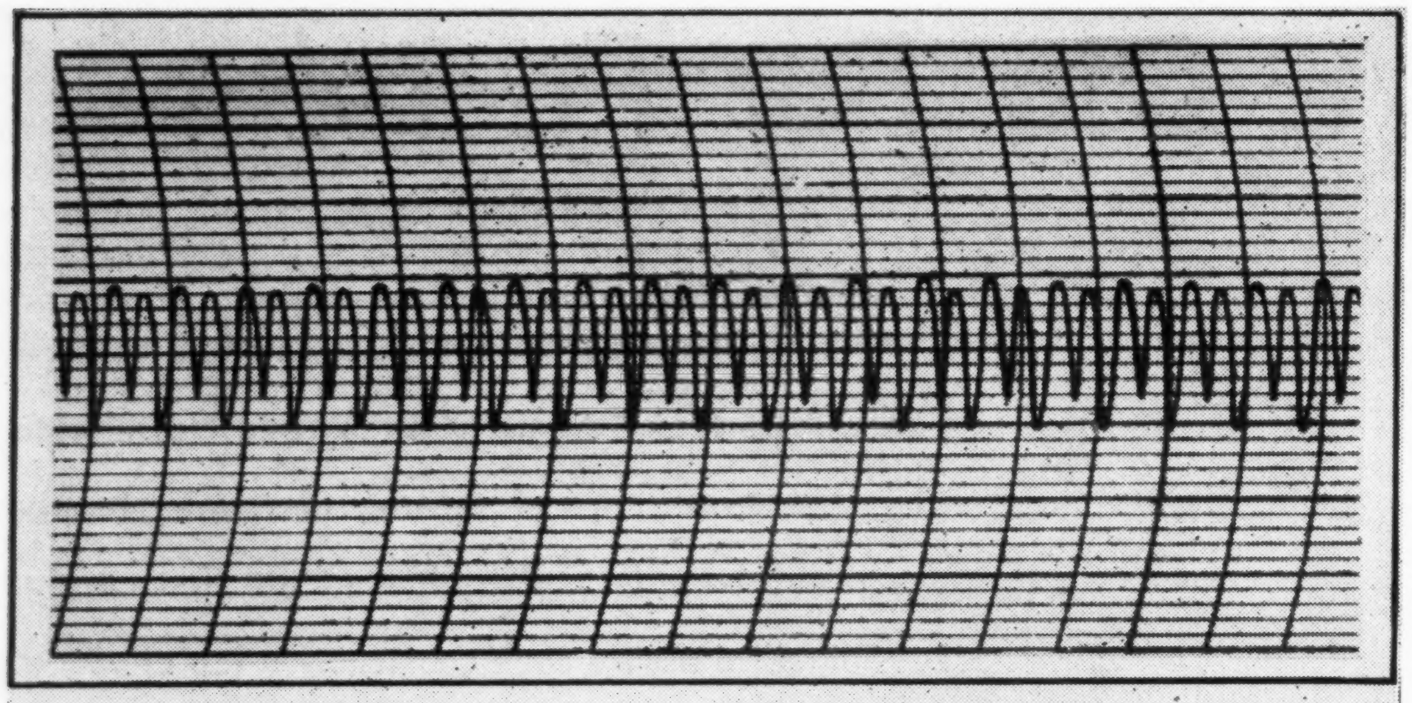


Fig. 4. Typical pressure wave existing in a lateral from a single cylinder.

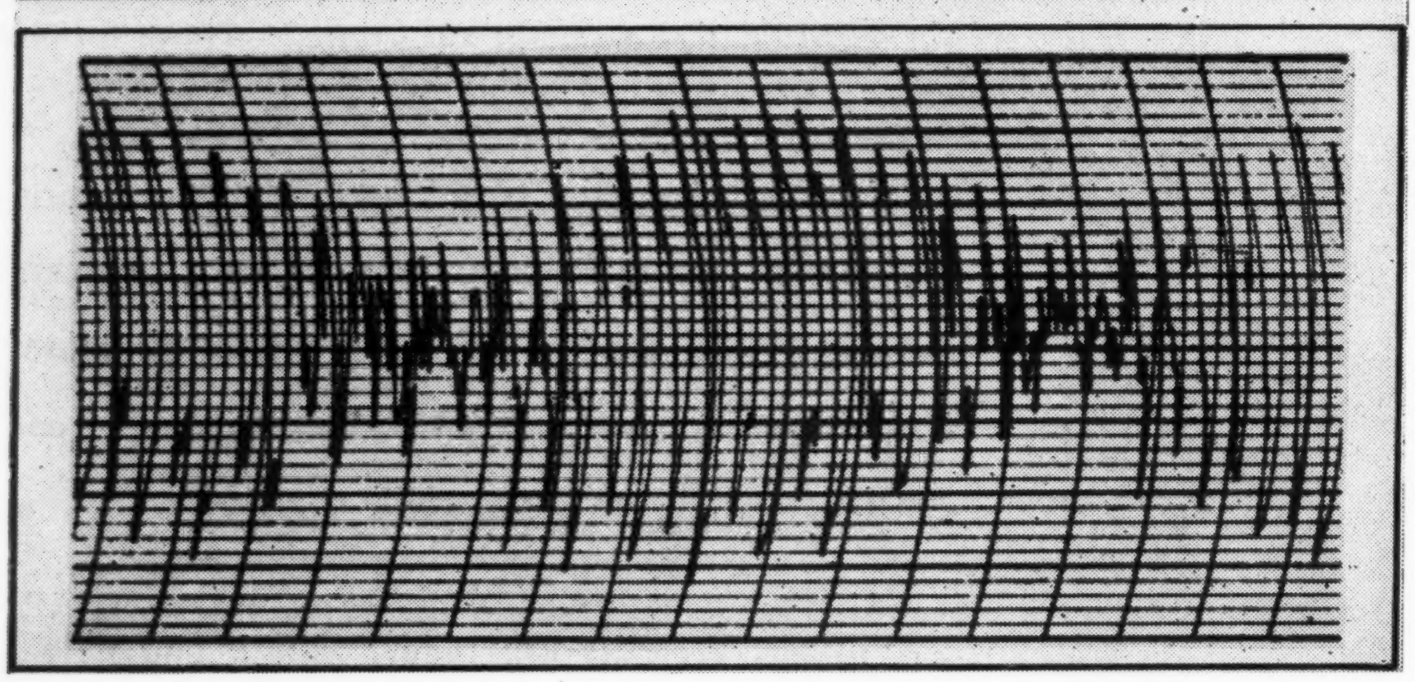


Fig. 5. Typical pulse pressure wave existing in headers.

Fig. 2 shows a plan view of the laboratory. The front section of the trailer houses the 110-volt power supply which allows the laboratory to be operated in unelectrified areas, and in electrified areas insures the electronic instruments of a stable, unfluctuating source of power. The 3.75-kilovolt-ampere generator is driven at 1800 rpm with a direct-coupled 4-cylinder Hercules gasoline engine. This engine takes its air in from the top of the trailer approximately 9 ft above the ground, past the generator, and blows it out through the radiator near ground level. With air being taken in at the highest possible level, any danger of fire due to heavy hydrocarbon gas accumulations near the ground level is eliminated. By double shock-mounting the generator and engine with Lord Shear type shock mounts, vibration of the trailer floor by the motion of the generator engine was reduced 90% below that absorbed by ordinary compression-type motor mounts. Noise from the engine was reduced to a minimum by means of a 4½-in. thick layer of insulation, consisting of a 2-in. layer of rockwool and 2 in. of Fiberglas covered with a ½-in. layer of acoustical Fiberglas.

Just to the rear of the engine on the left side are a folding table and bench for use in making sketches and checking blueprints of the plants. Located on the right side to the rear of the door is a control console.

The front console panel is for starting, controlling, and indicating the functioning of the generator and its engine. Mounted on the next panel to the right are the controls for the two Brush recording amplifiers located behind the panel, and directly in front of this panel is the dual channel Brush oscillograph recorder. Still further to the right are the controls for the direct current amplifier used in making instantaneous differential pulse pressure recordings. The console arrangement is shown in *Fig. 3*. Mounted in a small rack under the right side of the console are the direct current amplifier and a voltage regulator which will regulate its output voltage to within 0.25% against changes of input line voltages over the range of 95 to 125 volts.

Right Side

Located on the right side of the trailer are the portable instruments; i.e., vibration meter, vibration frequency analyzer, sound level meter, sound frequency analyzer, Strobotac (a device used for motion study) and a cathode ray oscillograph.

The electrical information from the pressure transmitters is conveyed to the trailer by means of shielded cables which are stored, when not in use, on reels which have an electric motor rewind mechanism with an external access door near the rear of the trailer on the right side. Communication between the trailer operator and personnel at the test station is maintained by means of small walkie-talkie portable transceivers operating in the 49-Mc band.

The rear section of the trailer offers a small work area as well as providing storage space for pressure pickups, small pipe fittings, valves, tubing, tube fittings, pressure gauges, dead weight tester, spare parts for the equipment, and small hand tools.

Trailer Parked Near

In setting up the mobile laboratory for a pulsation test in a repressuring station, for example, the trailer is usually parked as near as is practical to the compressor building, permission being obtained from the superintendent or safety committee member to operate the power plant. To make a pulsation measurement, it is necessary, of course, to place the pickup in the gas stream, which is usually done by using existing pressure taps, blowdown valves, and gauge connections—or, near the compressor, by temporarily replacing thermowells with the pulse pickup. After the pickups have been placed, cables are run out from the mobile unit and connected to the pickups and to the amplifiers in the trailer. The amplifier gain is increased to give a suitable pen deflection on the recording oscillograph, usually about 20 to 25 millimeters, and a recording is made. Information such as static pressure, temperature, number of compressors on stream, and exact location of pulse transmitter at the time of each test are sent to the trailer by means of the portable radio phone system.

Fig. 4 shows a typical recording of a pulse pressure wave generated in the discharge lateral of a compressor. *Fig. 5* is a typical pulse pressure wave recording taken in a header into which several compressors were discharging. This trace very clearly shows the beat phenomena occurring when the pulses from two or more compressors build to a maximum amplitude and decay to a minimum.

The most essential item used in measuring instantaneous pressure variations in a gas system is the pulse pressure transmitter. There are several types of transmitters manufactured which are

suitable for this purpose, the most sensitive of which is a piezo-electric type using Rochelle salts in a crystalline form. Pulsations of the gas stream impressed on the diaphragm bend the crystal through a system of levers which cause it to develop a voltage according to the piezo-electric effect. The crystal transmitters are built to operate at pressures up to 5000 psi with a frequency response good from one to several thousand cycles per second. Such a crystal transmitter has one very important drawback, however, in that it is very easily damaged if the crystal reaches a temperature above 130°F.

Pulse Transmitter

The pulse transmitter generally used by this laboratory in field measurements is one that operates on the magneto-strictive principle. In operation, the gas pressure is against a diaphragm which is mounted under tension against a core of magneto-strictive material. Any pulse pressure variations cause the diaphragm to increase or decrease its tension on the core, which in turn creates a change of magnetic flux. Around this magneto-strictive core is wound a coil of many turns of fine wire in which any change of magnetic flux will induce a small voltage on the order of several ten thousandths of a volt per pound of pulse pressure. The pulse transmitters are fitted with ½-in. pipe threads on one end for ease of connection to the gas system; the other end is for electrical connection only and requires a special connector for the coaxial shielded cable. The inner cable conductor is connected to the insulated contact and the outer shielding conductor is connected to the shell of the transmitter.

The minute voltage generated by the pickup is transmitted by the shielded cable to the preamplifier and electronic integrator in the trailer, and hence to the recording amplifier which increases the voltage still further until it reaches sufficient amplitude to suitably deflect the pen motor in the oscillograph. Integration is necessary to make the output of the magneto-strictive transmitter proportional to the amplitude of the pulse wave instead of the frequency of the wave.

The recording oscillograph is a direct-inking, dual channel strip chart device. Its design makes it possible to make two simultaneous recordings adjacent to each other on the same strip of chart. Simultaneous records are essential in determining the relation of pipe movement to gas pulse, or gas pulse to the source of the gas pulse. The pen motors of this recorder will record any frequency from direct current up to 120 cycles per second at any of three chart speeds: 5, 25, and 125 millimeters per second.

In obtaining recordings of the instantaneous differential pressure drop across a meter orifice, amplification from a transmitter of the static pressure drop as well as the alternating portion is necessary. The standard pulse pressure transmitters and amplifiers are not suitable for this purpose, their frequency response being good only down to one cycle per second. A special direct current amplifier was designed therefore for this purpose. The differential pressure transmitter is a strain gauge type in which the fluid pressure is impressed on a small bellows which is mechanically connected to the strain gauge. A bellows movement of only a few thousandths of an inch is necessary to give a good output voltage for this type of transmitter. The differential pulse record is made on the same recorder as is used with the standard pulse equipment, the only change being that the "zero" is set over to one edge of the chart. It is interesting to note that differential recordings have been made when the orifice was located near the compressor station, showing that the instantaneous value of the differential pressure reversed direction. In other words, the pressure drop across an orifice becomes negative for a fraction of a second.

Measuring Vibration

Vibration accelerations of pipes, vessels, compressors, etc. are measured with a General Radio vibration meter. This instrument is used by holding a piezo-electric crystal in a suitable mounting with an attached test prod against the vibrating structure and the acceleration is read directly from the meter scale on the instrument. Measurements of displacement and velocity are also made in a similar manner. It is possible to make recordings of structure movement by connecting the vibrations meter output to the pulsation amplifier-recording equipment. When necessary to determine the relationship of pipe or structure movement to gas pulsations, the vibration pickup is clamped to the surface of the structure and a pulse transmitter is connected in the gas stream as near as possible to the vibration pickup, and simultaneous recordings are made of pipe movement and gas pulsations. If the recording shows the structure vibrating in phase with the gas pulsations—i.e., the vibration increasing or decreasing with the beat phenomena in the gas stream—it can then be assumed the vibration is probably due to pulsative gas flow.

A further check of vibration source is made by comparing a frequency analysis of pulsations in the gas stream against a vibration frequency analysis of the structure. In both cases, the analysis is made on a General Radio instrument known as a vibration analyzer, which is a frequency selective instrument that will respond only to the frequency to which the dial is turned at the time. Thus complicated waves, such as shown in *Fig. 5*, can be analyzed not only as to frequency, but also as to proportional amplitudes of the individual frequencies.

A sound level meter and sound frequency analyzer are also included in the trailer equipment. The sound level meter is a direct reading instrument used in determining sound levels in or near compressor stations, or other sources of noise. The sound level meter in conjunction with the vibration meter can be used to determine whether windows or walls of buildings near a compressor building are vibrating due to sound waves or mechanical conduction of vibration through the ground. The sound frequency analyzer is identical in principle and operation to the vibration analyzer except for frequency range, and is used in the same manner to determine the frequencies and proportionate amplitudes of a complicated sound wave.

A Dumont cathode ray oscillograph is used whenever it is necessary to determine if frequencies beyond the 125-cycle-per-second limit of the magnetic pen motor recorder exist in the gas stream, since the cathode ray oscillograph has a frequency range of from one cycle to 100,000 cycles per second. A 4-in. x 5-in. view camera mounted in front of the oscillograph screen will give a photographic record for later study.

Results Obtained

The consolidation of instruments into the mobile laboratory has made it possible, with a minimum of time required for a survey or delay in traveling from one site to another, to obtain the following: recordings of pulse pressure waves in any part of fluid streams; recordings of instantaneous differential pressures across orifices, scrubbers, dampeners, etc.; simultaneous relationship recordings between pulsation and vibration, vibration and sound, and pulsations in two different portions of a system; frequency analysis of pulsation, vibration, or sound waves; vibration data on vessels, pipes, and engines; and sound level data on mufflers and surrounding areas.

Since all the instruments necessary to perform the various types of surveys are always carried, it is not necessary to return frequently to the home base. The laboratory has been in the field for periods up to five months. This mobile laboratory has been used in surveying some 50 stations and has traveled more than 45,000 miles over wide areas of the U. S. and Canada.

PIPELINE NEWS

EAST OHIO LOSES

Court holds intrastate line subject to FPC

FPC has won another round in its bout to take over the authority of state public utility commissions (*GAS*, January 1949, p. 48).

Last month, the Supreme Court reversed a lower court ruling of last year and brought the intrastate activities of East Ohio Gas Co., Cleveland, under FPC surveillance. East Ohio will thus have to procure federal certificates of convenience and necessity, comply with the commission's cost and accounting procedures, and submit plans for abandonment and construction to the commission for approval.

The 5-to-2 decision was written by Justice Hugo Black.

The immediate significance of the decision is seen in the fact that 43 other cases involving similar questions of jurisdiction are now pending before the commission.

East Ohio operates 650 miles of transmission lines entirely within the state, but buys its gas at the state border. The company claimed that these facilities were for "local distribution," a phase of operations specifically exempted from the terms of the Natural Gas Act. But Justice Black and his associates felt that facilities for local distribution included only equipment for distributing gas among consumers in a single community.

Dissenting Justices Jackson and Frankfurter held it obvious that "intrastate transmission lines of a retail gas company, devoted exclusively to serving communities within the state, are facilities used in the local distribution of natural gas and are accordingly exempted from application of the act."

Reserves Disagreement Brings Recess In San Juan Case

Hearings had hardly more than begun in the celebrated San Juan case last month (*GAS*, Nov., 1949, p. 98) when the Federal Power Commission granted a 90-day recess, setting the new hearings for April 17.

The move revolved about the question of reserves, wherein separate interests have been waging a tug-of-war for some months over whether the "four corners" area, embracing parts of Colorado, New Mexico, Arizona, and Utah, has sufficient gas underground to permit El Paso Natural Gas Co. to pipe out 165 MMcf for transmission to the Pacific Gas & Electric Co., San Francisco.

Witnesses who had appeared for the state of New Mexico, asked to prepare additional reserves exhibits, reported that more time was needed—and El Paso, deciding it could use some more time to firm up its contracts for gas supplies, suggested the postponement.

In the fracas over the question of reserves, states were pitted against states and, in the case of New Mexico, various state representatives were working at cross-purposes. Colorado's Attorney-General Metzger reintroduced his state's opposition to exporting gas, and Utah officials seemed to agree. Sen. Dennis Chavez (D-N. Mex.) declared the basin would be drained in 7½ years if withdrawals were made at the 165-MMcf per day rate. New Mexico State Land Commissioner Guy Shepard disagreed, and on his side were Congressman John E. Miles and State Geogogist R. R. Spurrier.

The state's experts have set reserves at 2.3 trillion cu ft, with "semi-proven" reserves at 11.7 trillion. But FPC counsel thought the methods used to arrive at the figure were questionable.

The matter will be further debated in April.

Commonwealth's Move to Block Piedmont Plan Fails

FPC has denied the Commonwealth Natural Gas Corp.-Virginia Gas Transmission Corp. motion which would have eliminated Piedmont Natural Gas Corp. from hearings relating to markets for natural gas in Virginia, which both Commonwealth and Piedmont propose to serve under applications now pending commission decision.

Commonwealth and Virginia Gas had asked, in part of the motion they filed, that Piedmont's application be severed from the consolidated proceedings involving the applications to serve the Virginia markets, and that Piedmont's intervention in the applications of the other two companies be dismissed.

Both Commonwealth and Piedmont propose to transport and sell natural gas for resale in Richmond and Norfolk, and Virginia Gas is proposing to sell gas to Commonwealth which it would have obtained through Tennessee Gas Transmission Co. and United Fuel Gas Co., the latter a Virginia Gas affiliate. In addition to the Virginia cities, Piedmont would serve the Piedmont region of the Carolinas.

Commonwealth and Virginia Gas had contended in the motion that Piedmont had not the facilities nor the gas supply that it would need under its proposal, and that customer companies would suffer delays in obtaining natural gas if Piedmont is authorized to construct necessary facilities.

In denying the motion, FPC ruled that since hearings on the Piedmont application were already in progress, the matters alleged by the two companies were "not timely," although they were proper for consideration by the commission in reaching a decision.

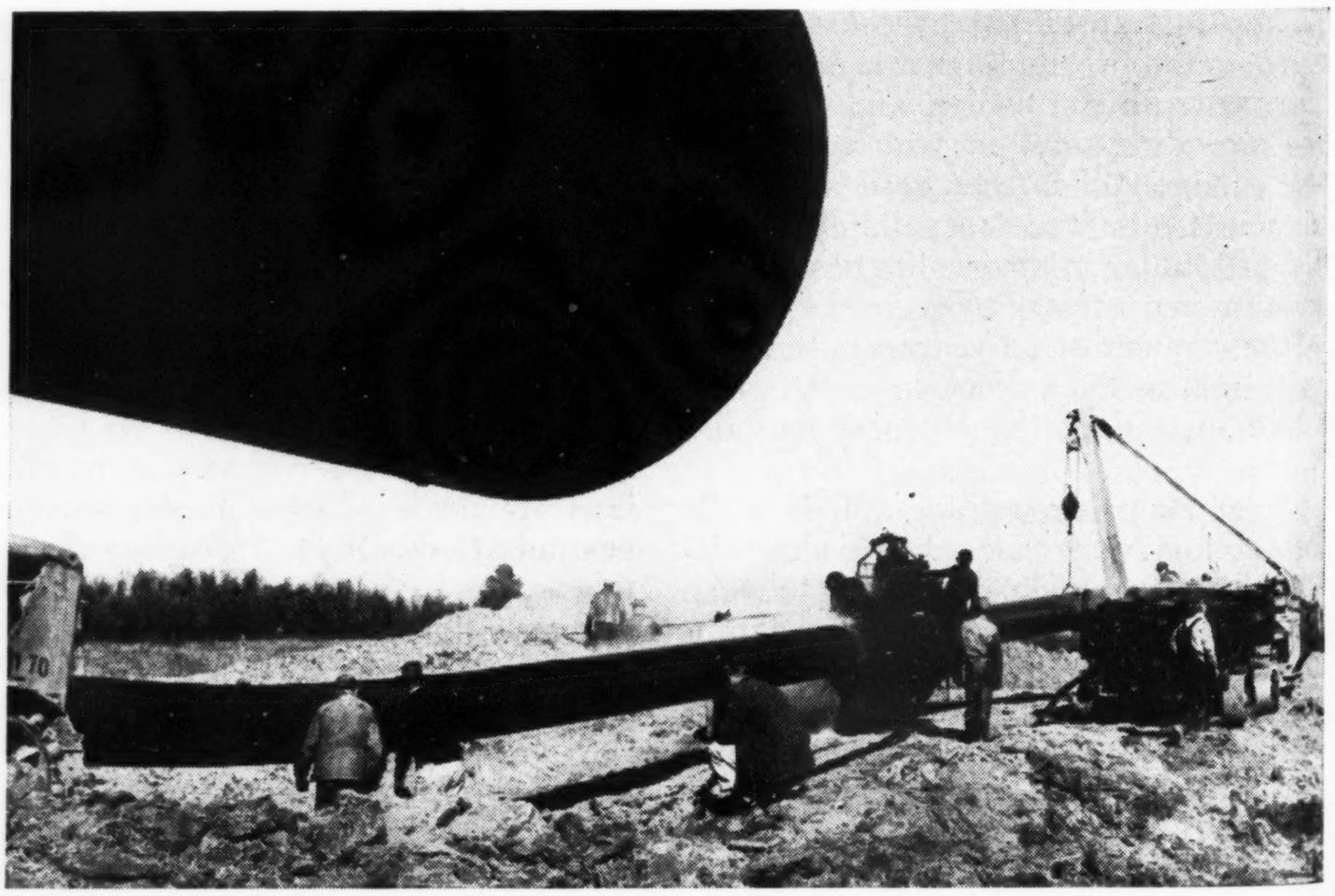
Michigan - Wisconsin Compressor Capacity Boosted 8000 Hp

A boost of 8000 hp in compressor capacity has been authorized by FPC for the Michigan-Wisconsin Pine Line Co., bringing the total horsepower on the main line from Texas to 29,600.

Michigan-Wisconsin asked the commission for the increase when it was found that pressure of the gas that it receives at the source was lower than had been anticipated. No new customers nor greater sales capacity will result from the authorization, which is a modification of a previous order (in August) authorizing the construction of facilities to provide a total capacity of 155 MMcf daily on the Texas-Michigan line.

FPC also allowed an interim rate schedule to remain in effect until Jan. 31, and advised Michigan-Wisconsin to have filed a satisfactory natural gas tariff by Feb. 1.

Annual sales capacity of the Michigan-Wisconsin facilities will remain at the previously authorized level of 56,575,000,000 cu ft. The company, under the commission order, will install two 2400-hp units, one a spare, at its Hugoton (Texas) station, and a spare 1600-hp unit at each of two other authorized compressor stations.



Here's a view of the biggest major pipeline both started and virtually completed in 1949—Texas Gas Transmission Corp.'s Texas-Ohio line. Only a relatively short section of line remains to be laid, although additional compressor capacity is to be installed.

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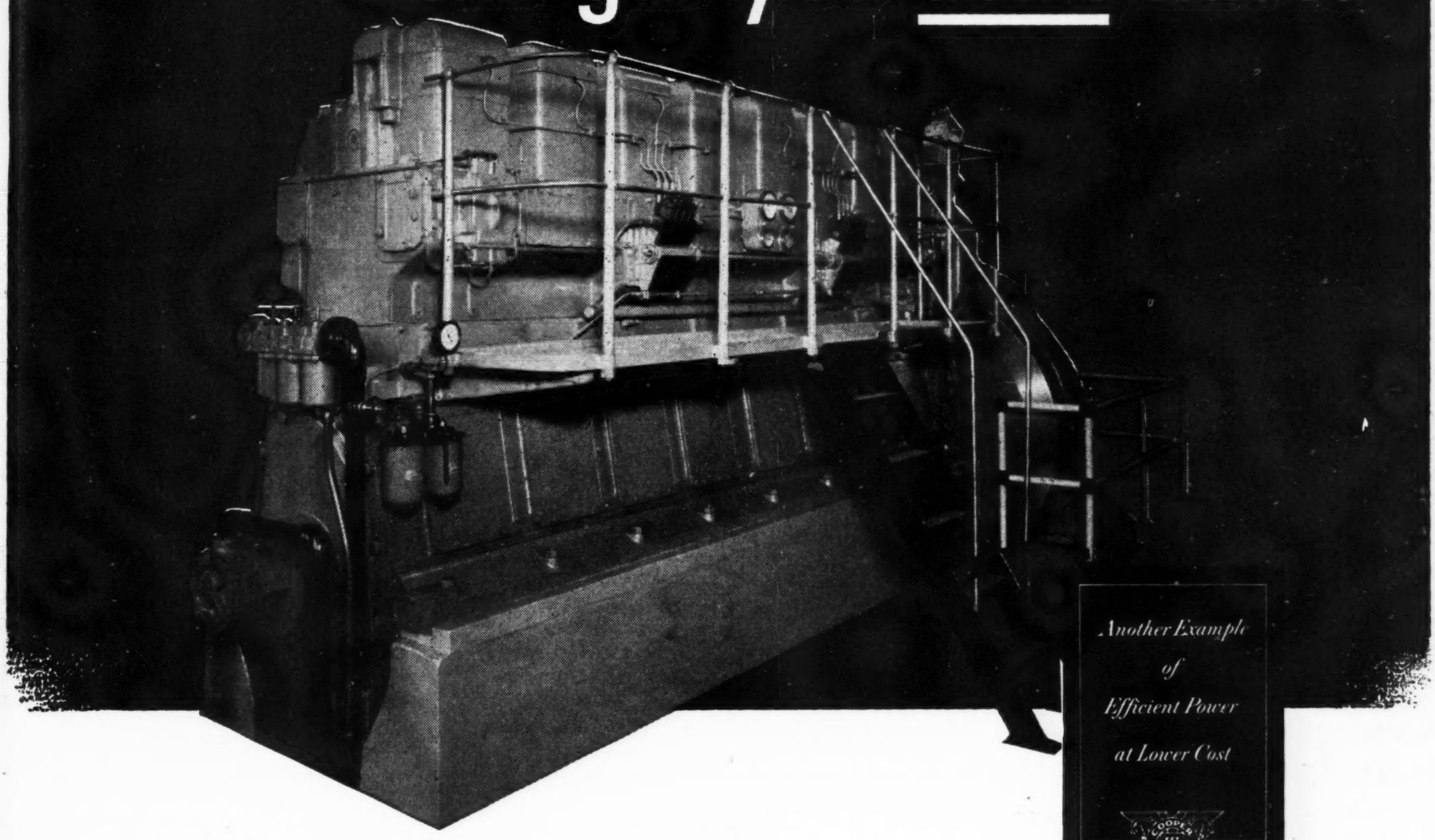

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New York Natural Would Up Supply to Albany, Syracuse

New York State Natural Gas Corp., New York, has filed two applications with the Federal Power Commission, proposing construction of facilities that would bring additional natural gas to customers in Pennsylvania and New York, including New York Power and Light Corp., Albany, and Central New York Power Corp., Syracuse.

The latter two companies, meanwhile, have filed with the commission a joint application for authorization to construct facilities necessary to receive additional gas from New York State Natural.

In one of its applications, New York State Natural is proposing to enlarge the transmission system and underground storage capacity of the existing facilities to keep pace with demand. This includes construction totaling about $2.6 million.

In its second application, the company proposes to enlarge its system and storage capacity to serve Central New York and New York Power with additional gas for distribution in existing markets.

This enlargement includes a 164-mile line from Dryden, N .Y. to Albany; a 56-mile line from Dryden to Tioga county, Pa.; and acquisition of additional leasehold and other property rights necessary to develop a new storage pool there. Seven miles of pipe and a 5000-hp compressor station would be built at the new Tioga pool.

Total cost of New York State Natural's enlargement and that completed by the two companies that would receive the extra gas would be an estimated $15 million.

Company Wins Charter For Line to Richmond

The Natural Gas Service Corp., which would deliver gas from Transcontinental's Texas-New York line to Richmond, Petersburg, and Hopewell, Va., won its charter last month from the Virginia State Corporation Commission.

The tie-in would be made near Buckingham, Va.

Approval of the charter further complicated the already muddled question of who will win the right to serve Virginia markets. Several weeks previously, the commission chartered the Virginia-Carolina Natural Gas Corp., an affiliate of Piedmont Natural Gas Corp., proposing to serve the same three cities as well as Norfolk, Danville, and several other municipalities within the state.

Piedmont, meanwhile, is carrying on its fight before the FPC with Commonwealth Natural Gas Corp. for the right to build a main transmission line to serve Virginia and other seaboard states.

Southern Natural Files For $32 Million Building Plan

A proposal that would increase Southern Natural Gas Co. pipeline capacity by 109 MMcf daily, through construction of new gas facilities, has been filed with FPC by the company.

The construction program, estimated to cost $32.5 million, would bring Southern's capacity to 529 MMcf daily. It includes 803 miles of pipeline—main line additions, branch line loops and connecting lines in Texas, Louisiana, Mississippi, Alabama, Georgia, and South Carolina—and installation of 19,200 compressor hp. New high-pressure lines stretching from the Gwinville (Miss.) gas field to Aiken, S. C. are included.

Thirty-eight communities in Alabama, Mississippi, Georgia, and South Carolina would benefit by the construction, in addition to customers in the existing Southern marketing areas of Alabama, Georgia, Louisiana, and Mississippi.

Pipeline Notes

Tube Turns of Canada, Ltd., which was granted its Dominion charter Dec. 2, is establishing a plant in Chatham, Ontario, for the manufacture of welding fittings. Tube Turns of Canada Ltd. is a subsidiary of Tube Turns Inc., Louisville, Ky. . . . Signal Pipe Line Corp., Long Beach, Calif., contracting company, is being merged with its parent company, Macco Corp. of Los Angeles. By performing its construction services as a part of Macco, Signal will be able to extend its operations, according to the parent company . . . The Texas railroad commission recently won the 14th round of a 16-round battle to enforce its gas-flaring ban. A district court cleared the way for enforcement in Seminole field, Gaines county, by dissolving an injuction obtained by Amerada Petroleum Co. and others. The two remaining fields still escaping terms of the December, 1948 order are Levelland and McElroy . . . Clinchfield Coal Corp. has brought in a fourth producing well on its 250,000-acre property in West Virginia. Completed at 5000 ft., it has been capped along with the other three.

Final Authorization Given For United Loop Line

An initial decision by the FPC presiding examiner was approved by the full commission in the case of United Gas Pipe Line Co. late in December, and the company has been authorized to build 105 miles of 20-in. O. D. loop line from DeSota county, La. to Ouachita county, La.

The project, to cost $5,113,300, is designed to increase deliveries of natural gas to Mississippi River Fuel Corp. by 122 MMcf daily—to a total of 195 MMcf daily. The new line will parallel United's 24-in. Carthage line, increasing its capacity to 432 MMcf daily.

The final authorization follows up a temporary one given in November, after Mississippi River Fuel had exercised its right to request additional gas from United (as provided in the purchase contract) when decreases in gas delivery from other sources were felt.

Boston Line Application Dies

Eastern Natural Gas Corp. has been allowed by FPC to withdraw its application proposing construction of a $28-million gas pipeline from Phoenixville, Pa., to Boston.

The company had filed the application last summer, and had asked in a motion submitted Dec. 19 that it be withdrawn. Under its original provision, Eastern would have built a main, 292-mile, 24-in. line and about 200 miles of sales lateral lines. The project was designed to have an initial capacity of 200 MMcf daily, for wholesale sales in New England.

Pipeline Progress Reports

NORTHERN NATURAL GAS CO., Omaha, has let four contracts to R. H. Fulton Co., Lubbock, Texas. A 22-mile stretch of 26-in. loops from Borger, Texas, to the Nebraska line is expected to get under way in early March. Personnel is still being selected. Another 155-mile length of 20-in. from Garden City to Bushton, Kan., will begin in May. Fifty miles of 20- and 24-in. near Liberal, Kan., under M. L. Boyd, spread man, has not been started as yet, nor has a Cimarron river crossing job near Liberal. Clark Williams is superintending all jobs.

MICHIGAN-WISCONSIN PIPE LINE CO., Detroit, reports four jobs under way. Three extra compressor units are being installed in the field station in Hansford county, Texas. One unit was to be in operation by the end of January. The three will boost horsepower to 16,800. At station No. 5, Onaga, Kan., one additional unit is being installed. Total hp: 6400. Another 6400-hp compressor unit is being added to station No. 10, Sandwich, Ill. Contracts have been let to G. G. Griffis Construction Co. for 186 miles of line beginning near Waukesha, Wis., extending northward to serve Fond du Lac, Sheboygan, Oshkosh, Manitowoc, Appleton, Two Rivers, and Green Bay. Completion is anticipated by May.

MICHIGAN CONSOLIDATED GAS CO., Detroit, had Somerville Construction Co., Ada, at work on four miles of 8-in. gas line which was completed Jan. 15. Pat Mask superintended the job. Three additional compressor units of 1600 hp each went into operation at Austin field compressor station, Big Rapids, Mich., Jan. 10. This boosts total horsepower to 9800.

CONSOLIDATED GAS ELECTRIC LIGHT & POWER CO., Baltimore, reported that in January installation of a 15-mile, 26-in. gas main and two smaller mains connecting the company's system with the Atlantic Seaboard Corp.'s transmission line was nearing completion. Changeover was scheduled to begin in May.

TEXAS EASTERN TRANSMISSION CORP., Shreveport, contracted 33 miles of 26-in. line from a point near Washington Courthouse, Ohio, west to Lebanon, Ohio, to Associated Pipe Line Contractors Inc., Houston. The spread under L. H. Gray, superintendent, had made 13 miles up to

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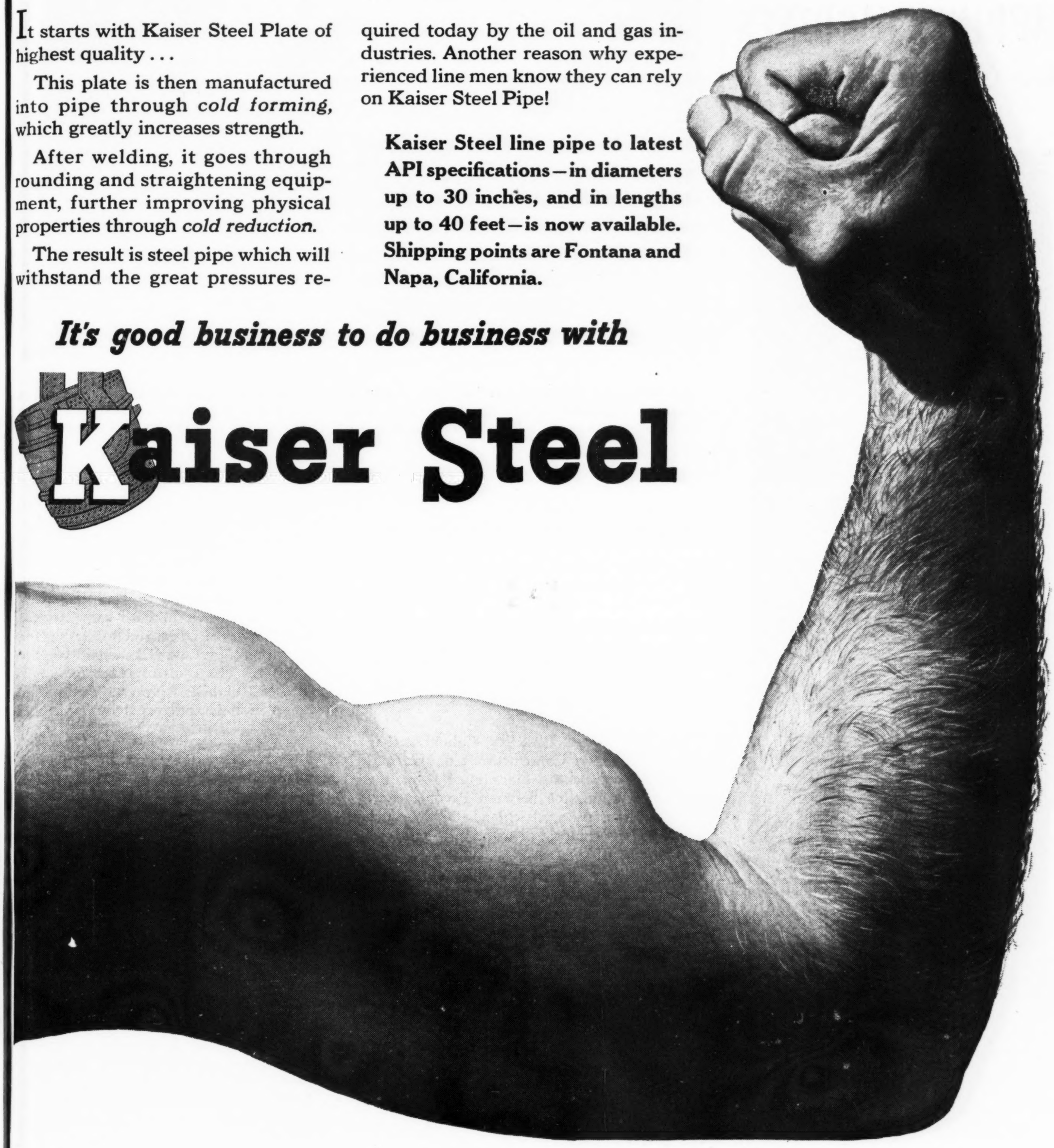

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Electric Resistance Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5 9/16" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
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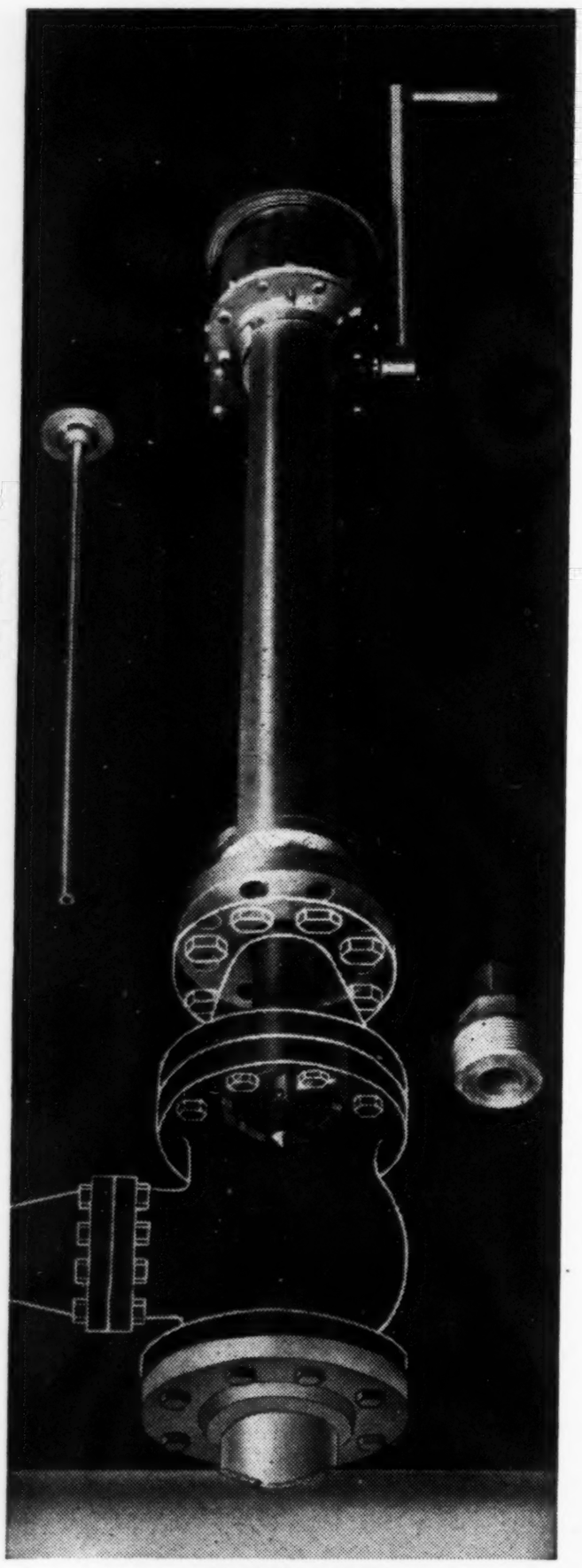

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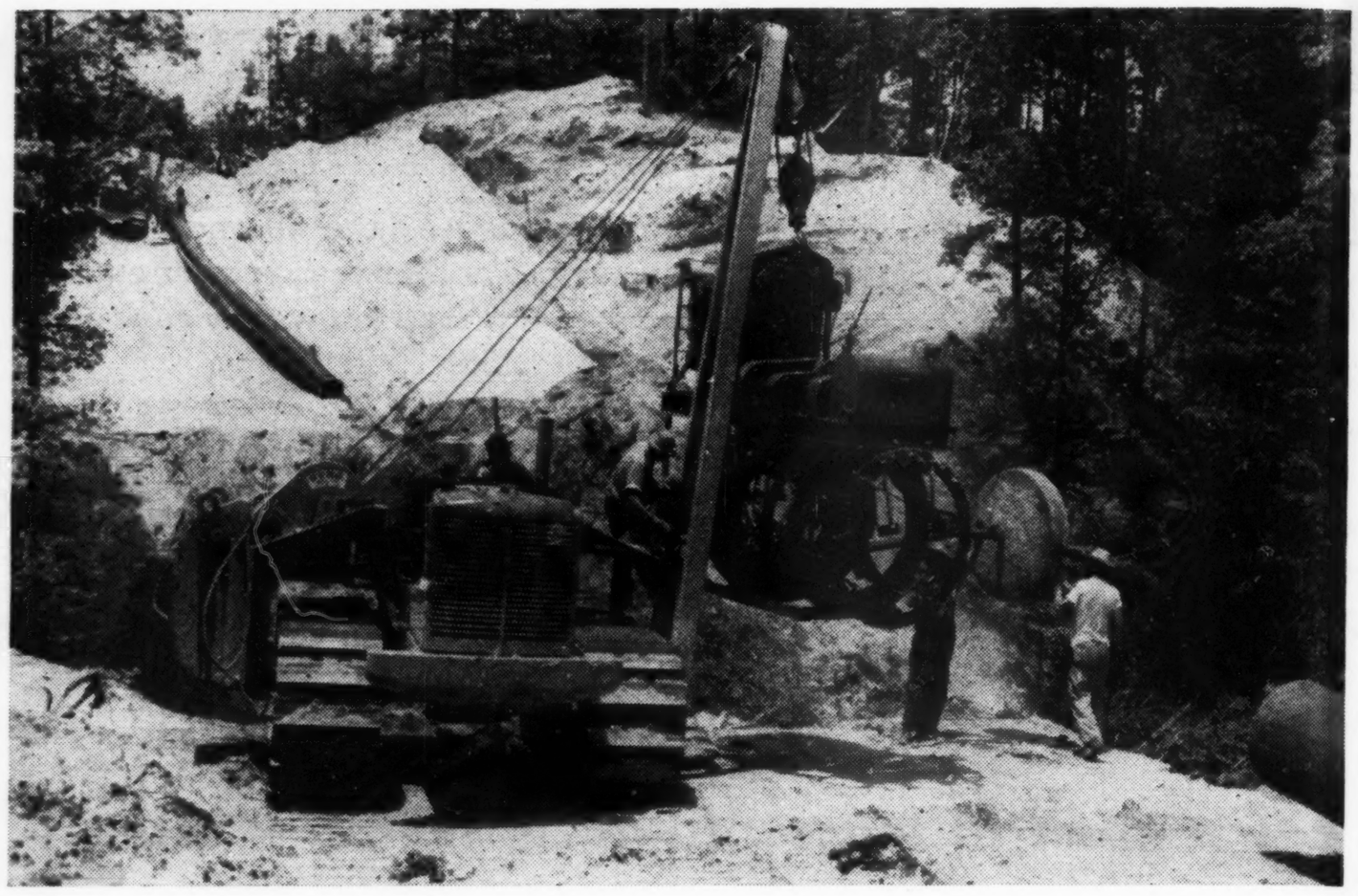


Cleaning and priming machine gets ready to start its ride along the 30-in. line being built by Transcontinental Gas Pipe Line Corp. from Texas to New York City. The job is moving ahead on schedule looking toward delivery of gas before the end of the year.

Jan. 10 and was expected to be finished by Feb. 15.

WESTERN KENTUCKY GAS CO., Owensboro, completed a 3½-in. line on Jan. 15. Construction under Modern Welding Co., Owensboro, started Dec. 15.

CENTRAL HUDSON GAS & ELECTRIC CORP., Poughkeepsie, N. Y., has not yet let contracts for its 40 miles of 10-in. line from Tuxedo to Poughkeepsie. The job is expected to be completed Aug. 1.

THE OHIO FUEL GAS CO., Columbus, has H. L. Gentry Construction Co., Jackson, Mich., at work on 11 miles of 18-in. gas transmission line between Pavonia compressor station, Richland, Ohio, and Weaver compressor station, Richland county, Ohio.

PHILLIPS PETROLEUM CO., Bartlesville, Okla., began work Jan. 1 on a 45-mile gathering system including 2- to 24-in. pipe in Fullerton field near Andrews, Texas. Vaughn & Taylor, Wichita Falls, Texas, contracted the job. Jess Moore was superintendent.

PHILLIPS PIPELINE CO., Bartlesville, Okla., had Vaughn & Taylor at work on 25 miles of 8-in. loops in the vicinity of Ottawa, Kan. The job was expected to be completed by Jan. 20. D. D. Vaughn was superintendent.

CITY OF MOREHEAD, KY., contracted with Modern Welding Co., Owensboro, to build 6-in. and 4-in. lines from Tennessee Gas Transmission's 30-in. main line to the City of Morehead. Work started Jan. 1.

TENNESSEE GAS TRANSMISSION CO.'S Mississippi river crossing, consisting of two 16-in. gas lines south of Greenville bridge, was under way last month. Latex Construction Co., Houston, was given the contract with J. A. Cantrell as superintendent.

EL PASO NATURAL GAS CO. has three spreads at work on two jobs—the 30-in. Texas - to - California loop running 600 miles from Jal, N. Mex., to Salome, Ariz., and a 30-in. crossover line 119 miles long from Salome to Topock, Ariz. Spread No. 1 at Willcox, Ariz., laid 43 miles of 30-in. in the 30-day period to Jan. 10. Spread No. 2, located at El Paso and Carlsbad, laid 27 miles of 20-in. and 8 miles of 8-in. Spread No. 3 at Casa Grande laid 16 miles of 30-in. The company expected to lay another 100 miles within the next month. Completion is anticipated by September.

PLAINS NATURAL GAS CO. has completed surveys on its Project A, consisting of 80 miles of 4- to 24-in. line. Contract was awarded to Arey Phillips Construction Co., Dumas, Texas. Work started Jan. 10. Lyle S. DeWitt is chief inspector.

UNITED GAS PIPE LINE CO., Shreveport, has two projects under way. A 69-mile stretch of 20-in. line looping the existing Carthage - Sterlington 24-in. line running through De Soto, Red River, and Bienville parishes, La., is being constructed by O. C. Whitaker Co., Fort Worth, which has two spreads—one at Ruston, La., and the other at Ringgold, La. Brown & Root Inc. also has a spread working on the loop out of Mansfield, La. Bad weather and Christmas holidays held progress in the past 30 days to five miles. The job is to be completed about March 1.

The second job, scheduled to be completed by Feb. 1, was 12 miles of 16-in. line and 34 miles of gathering lines to connect wells in the Cabeza Creek field in DeWitt and Goliad counties, Texas, into the company's existing Pettus - Converse 16-in. line. Brown & Root had one spread on this job, making 13 miles in the 30-day period.

TRANSCONTINENTAL GAS PIPE LINE CORP., Houston, reported that as of Jan. 1, 518 miles of its Texas-to-New York line was

in the ground. On the first construction phase, including 604 miles between Eunice, La., and Danielsville, Ga., clearing and grading is complete, pipe stringing virtually complete, most of the ditch cut, and welding about 90% complete. All river crossings have been completed except the Mississippi and Atchafalaya and the Coosa, which is about 50% complete.

Second phase of construction includes 709 miles from Danielsville, Ga., to New York City, and is well under way. Heavy dirt fills across the New Jersey meadows were expected to be finished by Feb. 1. Nine spreads were expected to get going in February. Midwestern Constructors Inc. had one stretch, including sections 4 and 5, 216 miles of 30-in. line from Demopolis, Ala., to Newnan, Ga., under M. T. Wilhite.

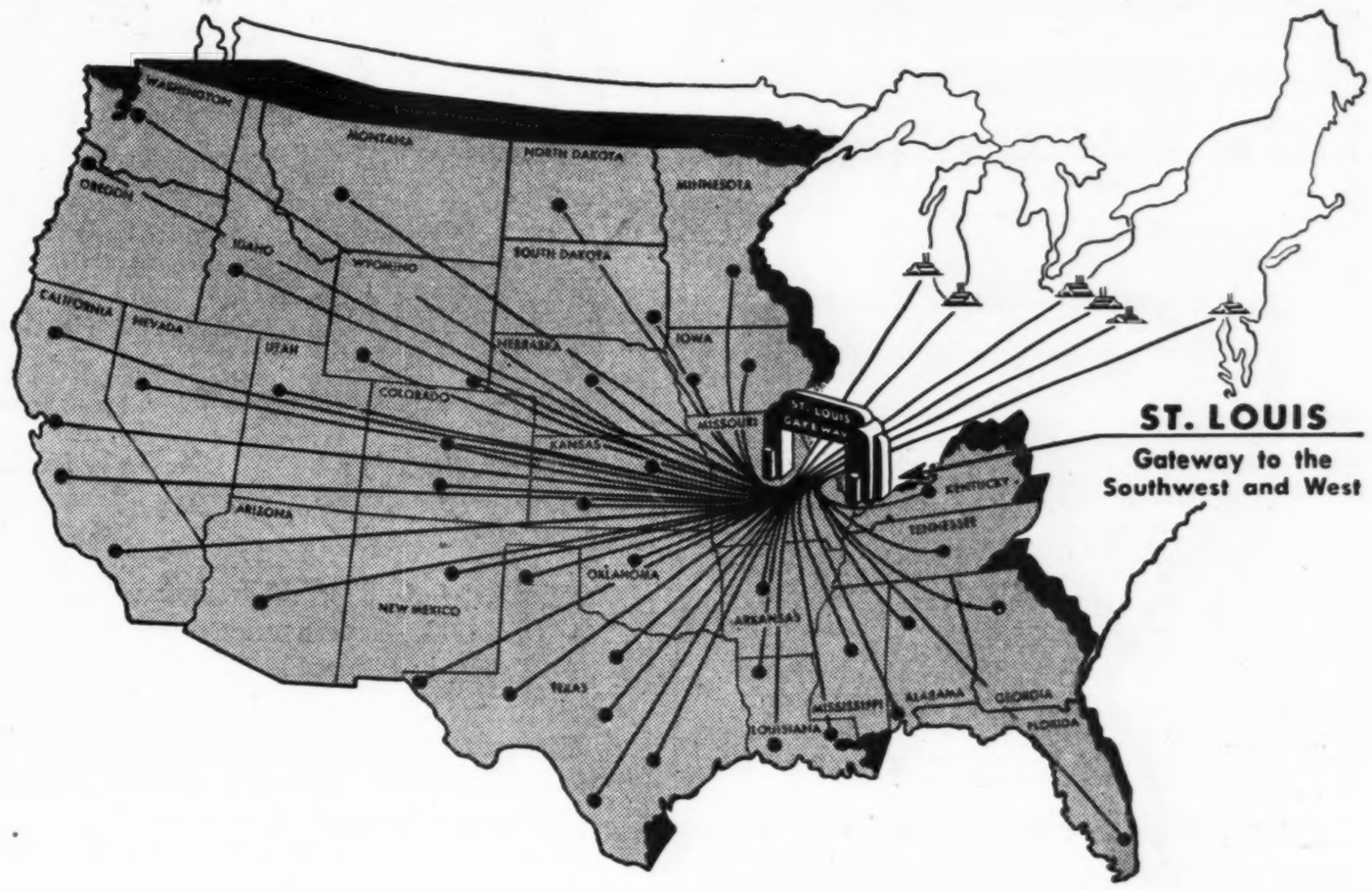
TEXAS GAS TRANSMISSION CO., reporting to Dec. 31, states that pipe for its entire line has been delivered. The 26-in. line has been finished from Sharon, La., to a point above Louisville — 591 miles — and is in service. The remaining 10 miles of 26-in. line (spread No. 9) was to be completed in January and deliveries of 165 MMcf to start to Texas Eastern at Middletown, Ohio, last month. Bad weather has held up construction on the 20-in. line between Carthage, Texas, and Sharon. Three construction crews laid 24 miles during the month.

Compressor stations at Sharon and Kenton, Tenn., are now operating, as well as the Slaughters station. Greenville and Lake Cormorant, Miss., stations were to be ready to operate late in January. The one at Jeffersontown, Ky., will be in operation by April 1.

The Red river crossing, consisting of two 16-in. gas lines near Curtis, La., contracted to Latex Construction Co., Houston, is virtually complete. H. E. Murphy is superintending the Latex job.

Pipeline People

A. C. KEYES (left) and C. E. SPENCER, president and general manager, respectively, of Keyes Tank Companies of Salt Lake City, Utah, and Casper, Wyo., are shown discussiing the distributorship recently awarded the Keyes organization by T. D. Williamson Inc., Tulsa. HAROLD E. DAVIS of Los Angeles also was appointed a distributor for the Oklahoma firm. Mr. Davis' territory embraces all of California.



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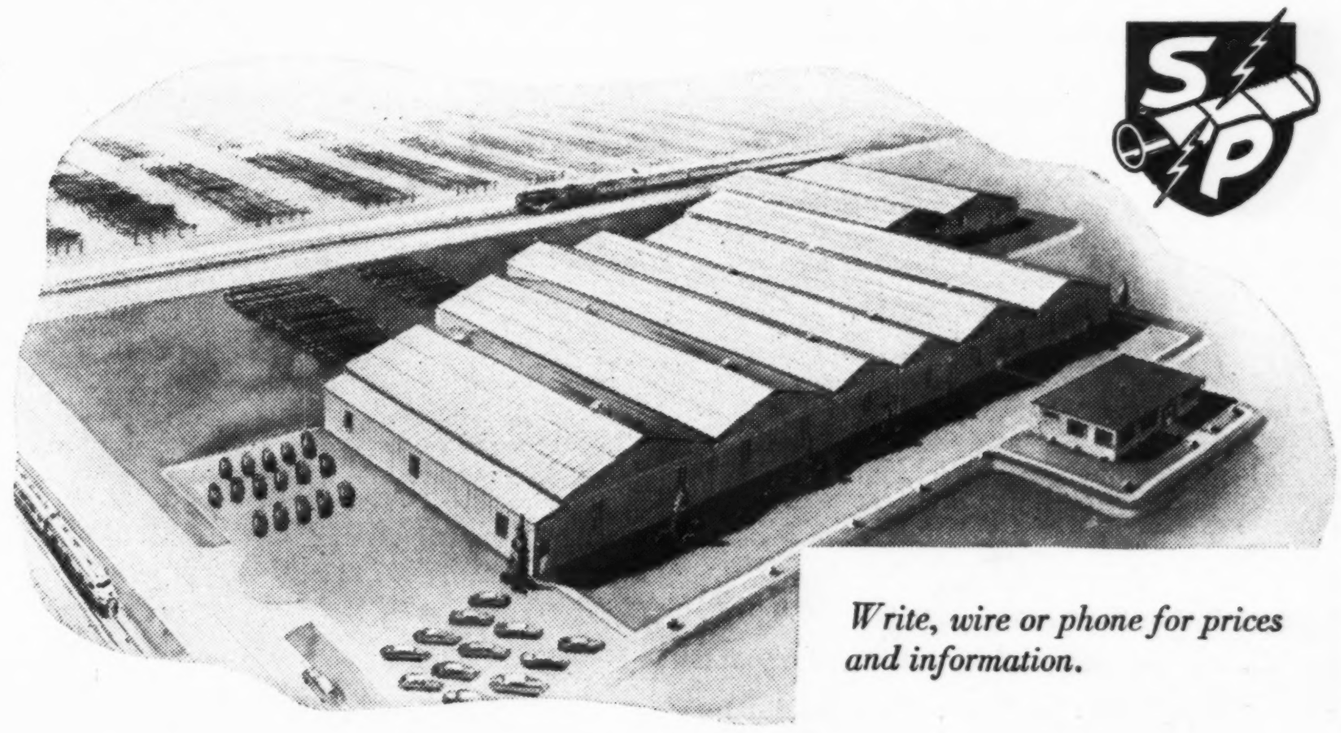

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WILLIAM J. RUSSELL and NELSON D. GRISWOLD have been elected to the board of directors of Dowell Inc., Tulsa. Mr. Russell joined the firm in 1934 and is presently assistant manager. Mr. Griswold has been associated with Dowell's parent company, The Dow Chemical Co., since 1927. From 1939 to 1941 he served as Dowell's chief engineer at Tulsa. From there he went to Dow's Freeport, Texas, plant, with which he is presently affiliated.

DR. IONEL I. GARDESCU and CURTIS MORRIS have been elected vice presidents of Transcontinental Gas Pipe Line Corp., Houston. Dr. Gardescu, an authority on natural gas reserves, joined the firm early in its history as head of the gas reserve department. Mr. Morris, who joined Transcontinental last April, will direct the company's public relations.

E. J. Jandacek

A. Rothenbuhler

. . . Texas Gas *. . . Cooper Bessemer*

EMIL J. JANDACEK has been named assistant chief engineer of the company's entire pipeline system by Texas Gas Transmission Corp., Owensboro, Ky. For eight years Mr. Jandacek has been associated with Stone & Webster Engineering Corp., New York City. That firm recently assigned him to the compressor station construction program under way along the route of the Texas Gas Transmission line.

A. A. ROTHENBUHLER, a resident Cooper-Bessemer Corp. (Mount Vernon, Ohio) service engineer, has been assigned to the company's newly established field maintenance facilities in Great Falls, Mont. C. R. JONES is in charge of the new facilities. Services will include the warehousing of essential parts of Cooper-Bessemer equipment in operation in the Northwest as well as maintenance of diesel engines on draglines, pumps currently used in refineries, and pipeline transmission systems in the area.

ERNEST N. SMITH, well known in the oil and gas supply industry, retired last month after 28 years with The National Supply Co. Pittsburgh. Since 1933 he has been eastern division manager, supervising an area including 32 of the company's supply stores. Mr. Smith has been prominent in activities of the American Gas Assn. and the American Petroleum Institute. He has been succeeded by WILLIAM VAN VLEET, who has been associated with National Supply since 1913.

FELIX F. BLANCO, a technician in the Argentine government's gas service department and recently appointed chief of maintenance and operation of the 1100-mile President Peron pipeline in that country, is now in the United States studying the various aspects of operation and maintenance of large natural gas pipelines. Mr. Blanco is considered an expert in steel pipe fabrication and pipeline instrumentation.

J. J. REICHART has joined Caterpillar Tractor Co. at San Leandro, Calif., as western news service representative. Mr. Reichart was in newspaper work for a number of years and also was associated with Caterpillar at Peoria, Ill., before the war.

J. L. MARTIN, vice president and director of pipelines for General Petroleum Corp., retired on Jan. 1 after 36 years of service in the pipeline department. He has been succeeded by GEORGE H. SUPPLE, manager of the department for the past 18 months.

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Model 620

always a bullseye!

• Now, more than ever, Goldak's Model 620 saves you time and money with immediate location of Buffalo Boxes, Valves, Covers, and Buried Metals. Large areas surveyed in a few moments. Sharp, clear signals. Untiring operation, weighs only 8 lbs. Sturdily constructed, all-weather use. High quality parts assures maximum sensitivity, low operating and nominal replacement costs.

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